MARCH.

THE

FIELD NATURALIST:

A REVIEW

OF

ANIMALS, PLANTS, MINERALS, THE STRUCTURE OF THE EARTH, AND APPEARANCES OF THE SKY.

EDITED

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LONDON:

ORR & SMITH, 14, PATERNOSTER ROW;

W. & R. CHAMBERS, EDINBURGH; AND W. CURRY, JUN. & CO., DUBLIN.

1834.

[PRICE ONE SHILLING AND SIXPENCE.]

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CORRESPONDENCE.—We regret that our present Number is deficient both with regard to letter-press and illustrations. We had intended to have given a coloured Engraving of the Wood-Chat, sent us last month by a correspondent, but it was delayed by an accident, and that too when it was too late to substitute another for it. We shall give it in our next, and make compensation in other respects.—Received papers from Ruricola; E. Blyth; James Fennel; W. Birt; T. C.; T. M. G., Edinburgh; J. B.; W. T., Dorking, Surrey; and Alpha. As the Editor does not interfere with the business department of the publication, he has transmitted Alpha's remarks to the publishers; he will see that Le Vaillant is not discontinued. A Well-wisher's remarks are quite just as to the inferior value of some of the statements of correspondents, and has rightly guessed the Editor's motives in such cases.

THE

FIELD NATURALIST.

ON PROCURING SPECIMENS OF BRITISH LAND BIRDS FOR A MUSEUM, WITH INCIDENTAL OBSERVATIONS ON THE HABITS OF VARIOUS SPECIES.

(*Continued from page 54.*)

BY E. BLYTH.

I AM sorry that a severe indisposition should have prevented me from continuing this subject last month; but if these desultory gossiping observations are worthy a place in your pages, I feel much pleasure in resuming them now.

In addition to the various remarks I made upon a kingfisher, which I kept for some time in confinement, I may here add, that it was very rarely heard to emit any sound; but that when hungry, or kept longer than usual without a supply of fresh food, it was at times extremely clamorous, uttering continually a sharp and loud chirp, resembling *chwite*. I have heard it said, that, on account of the extreme shortness of its legs, the kingfisher is unable to move forward upon the ground, but this is erroneous; if placed on the ground, it will generally fly off immediately, but I have, nevertheless, on more than one occasion, seen it with short quick steps waddle along in rather a ludicrous manner. I have lately examined a considerable number of jays (*Garrulus glandarius*), and think that to illustrate this species well both male and female should be preserved; in the former, the feathers upon the forehead are whiter, and the black spots consequently better contrasted than in the other sex: the tail also is more barred, and the colours of the whole plumage more lively: the female, however, exhibits a number of small transverse bars upon the crest, which, in the male bird, are scarcely discernible. My own observation of this species leads me to

corroborate a remark which Pennant has made concerning it, that the young follow their parents until the succeeding spring. Mr. Selby appears doubtful on this point; but I have always noticed them, in places where they are not much disturbed, to remain throughout the autumn and winter in small parties of five or six.

The swallow kind are in good feather for stuffing during the whole of their stay in this country, as they do not injure their plumage, and moult in the middle of winter. Four specimens are requisite to illustrate the common swallow (*H. rustica*); the adult male and female, and the young male and female in their first feathers. Of the other species two specimens, an old bird and a young one, are sufficient. The evejar (*Nychtichelidon Europæus*, Rennie) varies a little, some individuals being much brighter than others, and the delicate pencillings on their plumage being better defined. Three examples, male, female, and young, should be preserved. This curious bird is not rare in several places within a short distance of the metropolis; I have noticed it upon Penge Common, in Dulwich Woods, and in several other suitable localities, especially about the Coombe district, where I have compared its powers of ventriloquism with those of the little grasshopper warbler (*Salicaria locustella*, Selby); which species, however, is much its superior in the exercise of this strange faculty. It is well worthy of remark, that all animals which emit rolling, thrilling, rattling, or croaking sounds, have the power of making their voice appear to proceed from different directions: as examples may be adduced, besides the two birds above mentioned, the corn-crake, the water rail, the frog, the mole-cricket, and various other *Orthoptera*.

The evejar will often sit for hours, during the day, perched lengthwise on the top of some grey lichen-covered paling, or other similar situation where its colours are not conspicuous, looking like, and being often passed by and mistaken for, a large lump of mouldiness. At such times, it will occasionally suffer itself to be approached sufficiently near to be easily struck down with a stick; but if alarmed, it seems not much incommoded by the glare of day, but darts off to hide itself in some close fern covert, often at the distance of a couple of hundred yards, with as much promptness and confidence as any diurnal species, and in a manner very different from what some owls would do in similar circumstances. Of the various conflicting opinions which have been advanced respecting the use of the pectinated claw in this and other species, the most plausible is certainly that suggested by Mr. Hayward in the Magazine of Natural History for

September, 1830, p. 449; and by H. B. of Dublin, at p. 373 of the *Field Naturalist's Magazine*:—that it is formed for the purpose of detaching the sharp hooked claws of beetles, which hitch to the sides of the bird's mouth, and impede its swallowing of them. Certainly no kind of structure could answer such a purpose better, as may be readily seen, by bending the foot of a dead evejar to the mouth, and observing how extremely well it is adapted for removing whatever might adhere to it or to the vibrissæ. I have never been able, however, to find the remains of beetles in this bird's stomach; the few that I have opened having contained nothing but moths, principally, if not entirely, the different yellow under-wings (*Tryphæna*). A very simple method will go far towards determining whether or not this is the true use of it. The bird is often noticed, when flying, to bring its foot to its mouth; I have frequently seen it do so myself; and if, immediately after doing this, it were to be shot, and the just swallowed beetle found in its stomach, there would be no reason for hesitating to admit this to be the use for which it was designed. Perhaps your correspondent S. W. of the Isle of Wight will favour us with the result of some experiments on this subject, if his bird be still living. I may observe here, in reference to that gentleman's observations on the evejar, that the common swallow (*Hirundo rustica*) and martin (*H. urbica*) feed readily, and thrive well in confinement; and that, according to a very interesting note in the quarto edition of White's Selborne, by the Hon. and Rev. Mr. Herbert, the young swift (*Cypselus murarius*) soon learns to snap food from the point of a stick, but that (I think we may almost venture to infer *negatively* from the same note,) this species has but little notion of pecking up its food from the ground. If hunger cannot induce S. W.'s evejar to feed of itself, I fear that no other kind of method will prove successful.

To recur to the pectinated claw; I have just observed a somewhat similar structure in all the front claws of a bee-eater (*Merops Europeus; M. apiaster*, auctorum), now before me; only, that not being serrated, it forms a sharp cutting edge, turned inward, like the comb of the evejar. Can any correspondent suggest the use of this? Its consideration may, perhaps, throw some light on the much controverted question of pectinated claws. Does the bee-eater perch lengthwise, in the manner of the evejar? An apparently still more curious structure in the latter bird are the two spaces of transparent membrane inside of its capacious mouth, one in front of each eye, which would seem to intimate that it possessed the power of directing its eyes straight

forward, and seeing through its widely open mouth. A peculiar muscle, however, would be necessary to enable it to do this, which dissection proves not to exist; the eye is indeed sufficiently large and prominent to render such a power quite unnecessary.

The ash-coloured shrike (*Lanius excubitor*) is occasionally shot in this neighbourhood during the winter; but being exceedingly rare, I am unable to say any thing concerning it. The wood-flusher (*Collurio rufus*), also, I have never yet observed alive; but have seen two specimens of it, said to have been killed in Britain. The common flusher (*C. vulgaris*) is in these parts very abundant, and should be sought for on its first appearance in the spring, as the beautiful lilac gloss upon the breast of the male becomes in a few weeks much obscured. Several of our native birds are adorned with these lovely glosses, of various intermediate shades between pink and purplish lilac, when their plumage is in full perfection; a delicate pink may be observed on the breast of a cock whitethroat during the spring, and a trace of it also on some babillards; in the bearded tit (*Calamophilus biarmicus*, Leach), and bottle tit, these tintings are more permanent. Similar glosses may likewise be observed on the wings of certain butterflies; a full rose colour, for example, on the hinder wings of some male specimens of *Colias edusa*; also the rich and splendid purple which plays on the emperor's wings (*Apaturá Iris*). Two chief requisites should be present to form a fine specimen of the maleflusher shrike, some being much handsomer than others; the forehead should be white, or very nearly so, and the above-named lilac gloss tolerably conspicuous. A female should also be procured in the spring, and a specimen of the young in its first feathers, which should be sought for about the latter end of July, or beginning of August, not later, as they soon begin to moult. In their nestling feathers these birds are very handsome, the upper parts being beautifully barred with black; I have not Bewick's work now by me, but I think that author represents one in this state of plumage for the female wood-chat, another and very different species. The young flushers are easy to procure, as they follow their parents until they leave the country, and always indicate their presence by their perpetual clamour: which, though it may be heard at a considerable distance, generally appears as if close by, and leads one to imagine that in the nearest bush a brood of nestlings are about to fly; though accustomed to the sound, I have thus been often deceived. I know of no bird whatever, the eggs of which vary so much in shape, markings, colour, and size, as those of this shrike; they are usually somewhat similar in the same nest, but I hardly

ever remember to have seen eggs from different nests which bore much resemblance to each other. One in my possession has the zone of spots on the smaller end, and I have others which it would be impossible to distinguish from those of the robin.

The common grey fly-catcher (*Muscicapa grisola*) visits us in great abundance, but very late in the spring; and, what is singular, (being at variance with the garden warbler, swift, wood-wren, and other late summer visitants) is also very late in its departure. The sexes are much alike; a male should be procured early, and also a young one in its nestling plumage, which is mottled, like that of a young wheatear. I should have mentioned that all young birds should be procured, if possible, about a fortnight or three weeks after they have left the nest: that is, when their feathers are all quite developed, and before they have begun to moult them. The pied fly-catcher (*M. luctuosa*) is here a rare species, though not so much so as it has been described. I have two nests which were taken in this neighbourhood, and which are built more of moss, and contain less bass and other garden rubbish than those of the common species; they each contained three eggs, of a remarkably spherical form, and very pale pea-green colour. Some circumstances connected with one of these nests are worthy of being here recorded, as showing the remarkable attachment of this species to the place it has selected for nidification. A pair of pied fly-catchers took up their abode in a garden near this place; their first nest was robbed by a boy, and another was soon built in the same situation (against the ivied trunk of a large poplar), and four eggs laid; these were destroyed by a snake; and a third nest was actually constructed on the top of the last, which, with three eggs in it, and the broken egg-shells of the last adhering to the bottom, was brought to me as a curiosity, in the supposition that it was a nest of the common grey fly-catcher. I had it replaced as well as could be done, in about a couple of hours after it had been removed, hoping that after all the female would perhaps set; but so much persecution had at length driven the unfortunate pair from the place, and they were not seen afterwards: had the season been earlier, I would have placed the eggs in the nest of some other species, but it was now late in August, and very little incubation going forward. The two sexes of the pied fly-catcher are very dissimilar, and both should, therefore, if possible, be procured for stuffing; the young I have never seen, but from analogy should suspect it to be mottled. I am told that the song of this fly-catcher is pleasing, but have never yet heard it; the common species is one of the least vocal of our native birds, though

even it I have heard at times to chirrup forth a fragment of music; the usual call note of the pied fly-catcher is extremely dolorous, whence its specific name, *luctuosa*.

The different thrushes (*Merula**, Ray) should be procured in winter, as their plumage acquires no additional beauty in the spring, and as they are then, moreover, generally cleaner than at any other season. Of the blackbird (*M. vulgaris*) several specimens are necessary; its first plumage is mottled, like that of a young robin or nightingale; and the male may then be distinguished by being of a darker colour, and by the spots on its breast being generally more distinct. On their first moult, the males become wholly black, with the exception of the quill feathers, which, with those of the tail, are not changed till the succeeding autumn; the females, after their first moult, resemble the adult birds, only that the colour of the bill is not changed. Some female blackbirds have handsome spotted breasts, and I have seen some in which the bill is nearly as yellow as the male's; generally, however, the bill of an adult hen blackbird is only yellow at the base: that of the cock becomes yellow the first spring, and of an orange colour the second, at which time the bird has acquired its full beauty. The fieldfare (*M. pilaris*) varies very much; several specimens should therefore be obtained, and the finest of them selected for preserving; the female is smaller than the male, and its colours and markings less distinct; examples of both sexes should be preserved. A cock missel thrush (*M. viscivora*) should have the ground colour of the breast a fine rich sulphur yellow, and the spots well defined; the female is rather smaller, paler all over, and its spots in general very small; a young bird should also be procured in its mottled nestling feathers. Three specimens of the song thrush (*M. musica*) are necessary, representing the male, female, and young; the breast of the male, in this species, is usually of a deeper colour, and the spots smaller and better defined than in the other sex. The same remark applies also to the redwing (*M. iliaca*), though in both these species individuals frequently occur, the sex of which can only be distinguished by dissection.

A division has been made by some authors between the thrushes with plain, and those with spotted breasts†, but I think without sufficient

* As the central genus of the *Merulidæ*, or birds of the thrush kind, Mr. Selby has (I think with propriety) adopted Ray's name, *Merula*, for this genus, in preference to the subsequent appellation *Turdus*, of Linnæus.—E. B.

† All the species have the breast more or less spotted when young.—E. B.

grounds for so doing: the former (to which Mr. Swainson restricts the term *Merula*) are rather more stoutly built; and the common blackbird of this country differs a little in habit, being never, I believe, strictly gregarious, and passing its time more in low underwood, protecting itself by stealth and concealment, rather than by open vigilance like the thrushes with spotted breasts: but these characters are at most but of little importance, and are not constant in the exotic species. The *M. migratoria*, of North America, is as gregarious as the fieldfare, which bird it indeed very much resembles, excepting in being much more familiar; and moreover, some of the American thrushes with spotted breasts are solitary. This division is, indeed, quite unnecessary; but I think differently of the separation of the rock thrushes, (*Merles saxicoles* of M. Temminck,) and their formation into a genus (*Petrocincla*, Vigors). These form a very natural group *, and I am of opinion that the ring-ousel of this country (*Merula torquata*, Ray) should range in it. Hitherto it has been always placed among the wood-thrushes (*Merles silvanes*, Tem.); but it seems, in fact, to be an intermediate species, connecting the rock thrushes (*Petrocincla*) with that part of the genus *Merula* to which the blackbird belongs, but leaning rather to *Petrocincla*. It might with propriety, therefore, be denominated *P. meruloides*. This bird is very regular in its migration in these parts, appearing for a few days about the middle of April, and again at the latter end of September. Three specimens of it—male, female, and young—should be preserved. They are handsomest in the spring.

I shall conclude for the present with a few remarks on the common starling (*Sturnus variabilis*, Meyer). At least seven specimens are necessary to illustrate this species properly; the young are at first of a uniform brown all over, and one in this state should be preserved; they soon begin to moult; and a specimen, when moulting, should also I think be stuffed, in illustration of the change. Both sexes, immediately after the first moult, are very handsome, and specimens of them should be procured about November; the males are then very thickly speckled, and their hues brighter than those of the female; the spots of the latter are much larger, especially about the head and on the belly; the bill of each brownish black, or dark horn colour. The male that has moulted twice differs only in not being quite so much spotted on the

* A specimen of the blue-grey rock thrush (*P. cyanea*), said to have been shot in Kent, is now for sale, at Mr. Tucker's, in the Regent's Quadrant, London.—E. B.

breast, and in the bill being partly yellow; it is never yellow at the base, but purplish in the male, and brownish flesh colour in the female. At the third moult the male acquires its mature plumage, the feathers on the throat and breast being much more narrow, and sharper pointed than before, and not being tipped with white. About this time the female also acquires a yellow bill.

Tooting, Feb. 11*th*, 1834.

FIELD DIARY.

BY WILLIAM THORN, ESQ.

BEING a subscriber to your "Field Naturalist," and "Magazine of Botany," will you allow me to select a few observations, from my diary, on the past remarkable month?—a liberty I should not have presumed on, had you not given encouragement to lovers of natural history to send you their remarks, or "even the slightest hints." Although I am devotedly attached to this branch of science, yet (as will be but too evident), I am by no means an adept in it.

I have your "Insect Architecture," "Transformations," and "Miscellanies," also the "Alphabet of Insects;" but I want a Manual of British Entomology, giving a plain description of the size, colour, localities, &c., of those numerous insects which are constantly presenting themselves to our observation. Do you intend to publish a work of this kind, or can you recommend any already published *?

Will you permit me to suggest for your consideration, whether it would not be for the advantage of many of your readers, as well as myself, if you were monthly, or occasionally, to give plain descriptions, with wood-cuts, of some of our British birds, insects, reptiles, &c., which, though common in the fields and woods, are not generally known by name?

DIARY.

January 2nd, 1834. *Pirus Japonica*, and *laurustinus* in flower.

3rd. Larks (*Alauda arvensis*) congregating. A few fieldfares (*Turdus pilaris*) made their appearance.

4th. Heard a blackbird (*Turdus merula*) singing between seven and eight o'clock this morning. Remarkably mild for the season.

* My "Conspectus of Butterflies and Moths" is the only cheap English work. For other insects there is no similar work.—EDITOR.

7th. Sweet-scented violet, purple and white (*Viola odorata*, var. *purpurea et alba*) in flower. Observed a few yellow crocuses peeping between the leaves.

9th. Observed at nine o'clock this morning the wind was east, a dense fog—from eleven to one o'clock sunny, an upper current of clouds coming from the west, an under current from the south-east; at two o'clock rain commenced and continued till sunset, when the wind had changed to the south-west.

10th. Heard a thrush (*Turdus musicus*) singing.

14th. This day (St. Hilary's) is said, on an average of years, to be the coldest, but to-day the weather has been particularly fine and mild. I heard this morning a blackbird (*Turdus merula*), a sky-lark (*Alauda arvensis*), singing; observed a snow-drop (*Galanthus nivalis*), blue hyacinth (*Hyacinthus orientalis*), and many crocuses in flower.

15th. Heart's ease (*Viola tricolor*), furze (*Ulex Europæus*), in flower; wren (*Sylvia troglodytes*), singing; moles throwing up their heaps of fresh earth.

24th. Common laurel (*Prunus lauro-cerasus*), hazel (*Corylus avellana*), in flower.

25th. Saw some toads' (*Rana bufo*) spawn, many dung flies (*Scatophaga stercoraria*), common house-flies and gnats in numbers. Elm, (*Ulmus campestris*), dandelion (*Leontodon taraxacum*), *phillyrea* (var. *latifolia*) and countless daisies (*Bellis perennis*), in flower. Heard the ground sea particularly loud through the day*; this phenomenon (which has not been satisfactorily accounted for) generally precedes heavy rain and high wind.

27th. Observed pilewort (*Ranunculus ficaria*), creeping crowfoot (*Ranunculus reptans*), in flower; honeysuckle (*Caprifolium periclymenum*), and elder (*Sambucus niger*), in leaf.

28th. Blue tit (*Parus cæruleus*), chirping; *Corcorus Japonica*, purple and striped crocuses, and double-blossomed furze, in flower.

29th. *Arabis grandiflora* in flower. Observed on the branch of a larch (*Pinus larix*), in a warm and sheltered situation, some leaves just in the state of forwardness they generally are the last week in March, or first week in April.

30th. Saw a large elm felled, which was covered with flowers.

31st. Observed two gulls for the first time this winter. Very few fieldfares and redwings have visited us as yet; but to-day I saw a larger

* Grilston is about eighteen miles distant from the coast.

flock than at any time before this winter. Not a wild duck or widgeon has yet been seen about the streams in our valleys. Saw some frogs' (*Pama temporaria*) spawn; Gathered the first primrose (*Primula vulgaris*), yellow hawkweed (*Hieracium aureum*), scorpion senna, shepherd's purse (*Thlaspi latifolium*), and lychnis, in flower; sweet briar and gooseberry in leaf. An early shaw potato, which was left in the ground last summer, under a south wall in my garden, has produced a stalk one foot ten inches and a half in height.

P. S. (Omitted January 23rd.) I have frequently seen of late, a single heron by the rivers (Mole and Nymph), which I have no doubt comes from Pixton near Dulverton, the seat of the Earl of Carnarvon, (about twelve miles distant,) as there is a heronry in the park. They often visit us during the summer and autumn.

Grilston, near South Maldon, North Devon,
4th February, 1834.

VULTURES (*From Le Vaillant's Birds*).

CAPE VULTURE (*Egyps fulvus*, Savigny).

(*Continued from page* 89.)

Le Chasse-Fiente, *Le Vaill.*, Ois. d'Afriq. i. p. 44, pl. 10; Vultur Kolbii, *Lath.* Ind. Orn. Sup. p. 1; *Daud.* i. p. 15; *Temm.* Man. d'Orn. p. 4; *Id.* ed. 2d, p. 6; Kolben's Vulture, *Lath.* Gen. Lyn. Sup. ii. p. 12; *Id.* Gen. Hist. i. p. 19.

INDEPENDENT of the large vulture, described in the preceding article, there is still, throughout every part of Africa which I have visited, another large vulture, totally differing from the former, as much in its colours as in several characteristics which easily distinguish it from the other species.

I have suffered this bird to retain the name of *Chasse-Fiente*, which is the literal translation of the Dutch name *stront-jager*, applied generally by the colonists of the Cape of Good Hope to all vultures, and particularly to the one in question, because it is more commonly known. The *Oricou* is found only on the confines of European plantations, where, as I have previously observed, it is called the black carrion vulture (*swarte-aas-vogel*).

The *Chasse-Fiente* is the bird spoken of by Kolben under the same name, and which he has particularised as an eagle at the Cape. Buffon, it seems, in comparing this pretended eagle, at the Cape, to the genus

of Vultures, has not, moreover, failed to place it among the species of American *urubu*, and to conclude that the *urubu* equally inhabits America and Africa; a conclusion the more hazardous, inasmuch as it has not yet been shown in a single instance that any vulture is common to the new and the old world. But Buffon was not contented to stop here; he must needs precisely indicate the passage between the Brazils and Guinea by which the *urubu* traverses the sea, and repairs into Africa. If this naturalist had given himself the trouble to compare the *urubu* of America with the description of Kolben, he would have been easily convinced that the stout and crooked bill of the *stront-vogel* was not at all applicable to the *urubu*, which has, on the contrary, a bill so long and slender, that the Spanish and Portuguese colonists have given it the name of *gallinaco, gallinaca;* and the English, that of turkey-buzzard. The *urubu* has, in fact, a bill more resembling that of the turkey than the vulture. M. Dumarchais, who had remarked with great care the particular form of the bill in this bird of prey, inconsiderately concluded that it was a species of wild turkey, which was accustomed to eat dead bodies and carrion. Look at the *ourigourap* (plate 14 of Le Vaillant); it is also a vulture, and has a bill of nearly the shape of the *urubu's*, but rather longer.

It is a fortunate circumstance that the designer, at least, saw the *urubu*, when he made his figure of that bird; for it is, possibly, represented in Buffon's coloured plates, No. 187, under the name of the Brazil vulture. Is it not, however, astonishing that in Buffon's works all the birds, or at least nearly all of them, have, in the coloured plates, names different from those under which they are described? Is not this strong evidence of the way in which his work was executed? It is clear, however, that Buffon never saw the *urubu*, and never glanced his eye over the plate which represents it, or he would not have committed the error which he has done. But unhappily it requires no great effort to be convinced that all his relations have been written under the same disadvantages; that is, without his having seen or compared the species. It is yet deserving of remark, that the *Chasse-Fiente*, of Africa, is more than three times as powerful as the *urubu*, and but little smaller than the *oricou*. During repose its wings almost reach to the tip of the tail. This character alone would be sufficient to distinguish it from the *oricou*, whose wings go several inches beyond the tail. It has not, besides, the head and neck bare like the latter, but covered with a fine and cottony down, like the *percnoptera*, the vulture figured in No. 425 of Buffon's plates.

Before I compared the *Chasse-Fiente* with these two birds, I was of opinion that it belonged to the species of *percnoptera:* but from the confrontation of these three birds I saw that I was mistaken, and that the *Chasse-Fiente* was a new species to be added to the other two, which bear more resemblance to it than any other description of vulture.

The *Chasse-Fiente* should not be confounded with the *percnoptera,* since the character of the latter, in having its wings shorter and tail longer than the eagle's, is in no respect appropriate to the former, whose wings, on the contrary, are longer and tail shorter; besides, its head is of a clear blue, and its neck is not covered with a white but yellowish down. In a word, the *Chasse-Fiente* has not that brown heart-shaped spot on the breast which is peculiar in the *percnoptera,* and its colour is altogether different. The *Chasse-Fiente* cannot, moreover, be considered as a variety of the vulture, depicted in Buffon's plates, No. 425. A single glance at the two figures will convince those who shall take the trouble to compare them together.

The general colour of the *Chasse-Fiente* borders on Isabella yellow, and afterwards approaches what is called pale coffee brown. Some of the small wing coverts are marked with a deeper tint, and the large quills are blackish. At the nape of the neck is a sort of ruffle composed of long and slender feathers, curved by the friction of the head, which they totally conceal when the bird shrugs up its shoulders. The feathers, which cover the legs, descend a little over the fore part of the shank; the large scales, which cover the legs and toes, are brownish. The claws are blackish horn colour, as well as the bill. The iris of the eye is of a dark brown. The male and female differ but little from each other, and I never observed but a very trifling difference in their size; the male, indeed, is not quite so strong; but there must necessarily be that marked disproportion between them, which is observable between the sexes in almost all other species of birds of prey.

The *Chasse-Fiente* retires amongst the highest mountain rocks. Immense numbers of these birds inhabit the whole of that rugged chain of mountains which spreads over the point of Africa, from Cape Town to False Bay; whence they visit all the dwellings in the environs, and find abundance to supply their hunger: for as the country in the vicinity of the town is exceedingly dry, animals can find but scanty fare, and very frequently perish through want of food. Such is the cause that the carcasses of several oxen, which have been abandoned by their owners, are invariably to be observed in the roads. It is a providential occurrence on behalf of the indolent inhabitants of these climates,

that vultures deliver them from putrid infections. I have seen these birds fly down to the entrances of slaughter-houses, in order to feed upon the head and intestines of animals which had been killed there, and which the prevalence of a bad custom allows to be thrown before the door.

The *Chasse-Fiente*, also, frequents the sea-shores in great plenty, where the inhabitants deposit their rubbish, or house-dust. It is, also, attracted to these parts by the offal which is thrown overboard from vessels riding in the roads, as well as by the shell-fish, crabs, and dead fish, which the ocean ejects from its bosom. It is very probably owing to this abundance of food, that the species of *Chasse-Fiente*, which is much more numerous than that of the *oricou*, has so extensively multiplied in the colony of the Cape.

I know from experiments which I have tried, that this bird can exist a long time without receiving any food. One day, when a violent south-east wind had caused several of them to fall down into the streets of Cape Town, I took two alive; and, as these birds are in general excessively fat, in order to reduce them to a state of meagreness, I was desirous of famishing them to death. For this purpose, I ordered them to be put into a large hen-coop without food. At the end of some time, I killed one of them, which was still too fat. After that I suffered the other to fast several days; but seeing it grow enfeebled, and believing it to be lean enough, I killed it. I was much astonished, nevertheless, to find that it had even too much fat when I prepared it.

My remarks on the manners of the *oricou* are equally appropriate to the *Chasse-Fiente*, which has the same habits. This species, as I have already mentioned, has infinitely more increased than the other, although the females produce an equal number of eggs: those of the *Chasse-Fiente* are bluish white. These birds being of a more conspicuous colour than the *oricou*, are more readily perceived when perched upon the rocks at the entrance of their retreats, and known by their white spots. It is an agreeable sight to behold a troop of these birds quite covering an entire chain of mountains; the report of a *carbine*, loaded with ball, will be sufficient to set them all heavily on the wing, and cause them to wheel round in the air. In deserts, where vultures do not always meet with carrion in plenty, they feed on whatever they can obtain. I have killed some, which had nothing in their crops but pieces of the bark of trees, or clay,—often even bones, upon which there was no flesh whatever; and sometimes, also, the crop was filled with the excrements of animals. The savages assured me that

when vultures are oppressed by want, they reciprocally devour each other's young ones, and even their own: but I had never an opportunity of ascertaining the truth of this fact, and will not, therefore, be responsible for its correctness. The land turtles and land shells, at the Cape, which these birds swallow entire, are to them a very delicate prey: they also fling themselves upon those clouds of grasshoppers, which I have described in my travels.

A BACHELOR'S GLEANINGS.

YOUR bachelor correspondent (S.) has been wandering lately, and hopes a few gleanings may not be unacceptable.

I have been on the borders of the New Forest, Hampshire, and had an opportunity of witnessing the following extraordinary fact. The fallow deer there are remarkably fond of the common holly, but will only feed upon it when *cut* and thrown before them by their keepers, and then they strip off the bark and eat the leaves greedily; if not *cut*, they will never think of touching it.

Staying a few days at a friend's house, I was not more surprised than delighted with the following instance of the tame and domestic habits of the robin. Though my friend is father of a large family, the *pet* (for so the welcome little bird has been christened) invariably comes to the window at breakfast-time, taps violently with his beak at the window, hops in without the least alarm, feeds, and really saunters about for nearly an hour, then flies to the window, where he knocks violently again for liberty. Although the children are playing about, he hardly thinks it necessary to get out of reach of their romps. His visit is again repeated before night; he knocks for admission, and as the window opens walks in as a matter of course.

Last year I had a bed of tulips of rare and beautiful sorts, which I thought I would protect from chance of frost, by covering them with *tan*. They all flowered *perfectly black*.

This may not be uninteresting to some of your readers who study garden chemistry.

Shrewsbury, 4th February, 1834.

[Did S. remark whether the holly leaves cut by the keepers were with or without prickles? The lower branches of holly have their leaves always prickly, while the top leaves are smooth; a circumstance which led Dr. Darwin to fancy the hollies in Needwood Forest *knowingly* put out these prickles to defend themselves from the deer!!! The fact about the black tulips is exceedingly interesting. ED.]

SKETCHES FROM GRAVESEND.

BY ORNITHOLOGUS.

MANY thanks for your kind insertion of my former communication, as well as for your answer to my question relative to the nightingale's food used in Germany; I have no doubt that meal-worms are much used, but can hardly understand how they procure them in such amazing numbers. It is probably from the animation of warble which such stimulating diet excites that the German canaries acquire that astonishing vigour of song which they possess. One which I purchased last year actually commenced singing at the bottom of the chaise in which I was riding, and this too in the streets of London! I am, however, inclined to think that the bringing them into this high condition (if I may so express myself) has a tendency to shorten their lives, as their strength becomes prematurely exhausted by such extreme exertion. I will now relate the story of the grosbeak to which I referred in my last.

In the summer of 1832, I was informed that a pair of these birds had taken up their abode in a garden or plantation near Cobham. Aware of the doubts which existed as to their nidification in this country, I went over to convince myself of the fact by a personal inspection. Unfortunately I was a few days too late. There had been a nest placed on the projecting branch of an apple tree; but the owner of the garden had secured both the old ones, by placing the young ones under a sieve, and thus entrapping them when they came under it to feed them. They lived for some days; but did not appear to eat any of the food that was given them, with the exception of snails, which they attacked and devoured with great gusto, even before our eyes. The whole, however, soon died, and no others appeared in the neighbourhood. The owner promised to let me know if any appeared in the ensuing year, an event which did not seem probable, as this family had perished. In the month of May, 1833, I went over; and much to my satisfaction found that a pair had built their nest in the garden, and, what is most remarkable, on the same branch of the same apple tree! How can we account for this extraordinary predilection? Is it not possible that in countries where these birds abound they congregate after the manner of rooks, and return at the proper season to their favourite haunts, which might be called a Loxiary? I merely suggest this idea, not having the means of proving

its correctness; but there are two circumstances which give it the appearance of probability. The first is, that there is one member of this family, the *Loxia Socia*, or Sociable Grosbeak, found at the Cape of Good Hope, which breeds in the manner I have suggested. The other circumstance is, that whenever the Crossbill (*Loxia curvirostra*) appears in this country, it is generally in flocks. In my own neighbourhood, a few years since, a small flight of these birds came over and took possession of some high fir-trees in a garden close to a gentleman's house. Here they remained during the summer, when their progeny having arrived at maturity, they took their departure. Their habits were very interesting, and their familiarity seemed to imply that they had come from some region where man had not wrested his powers to their molestation. On the other hand, I am well aware that the bulfinch, and many others of this genus, are only found in pairs; so that doubts may exist on both sides. The nest was composed of small roots, lichens, and small sticks, much resembling that of the bulfinch, especially in the slightness of its contexture. On reference to my diary, I find that it was brought to me on the 27th of May, with two young ones about half grown, and the male parent, which had been caught in the same manner as in the preceding summer. I let them loose in a large volary, and anxiously watched to see whether he fed the young ones. Unfortunately I was taken suddenly ill, so that I could not bestow that personal attention to them I should otherwise have done; but I had the pleasure of seeing the old bird eating hemp-seed, and of hearing that he had repeatedly fed his offspring. Notwithstanding this, however, they did not appear to thrive, and after a short time died, the father surviving his young ones about a fortnight.

I think it very probable that this species might be taught to pipe tunes like the bulfinch, and wonder the experiment has not been tried. There is one circumstance I have omitted, relative to the nidification of this genus, which is, that there is a small species of green parrot which is gregarious; and as I consider them nearly allied to the *Loxia* family, (the parrot crossbill, or *loxia pityo-psittacus*, being the connecting link,) this fact seems to favour the idea. I am a great admirer of this genus, and think them very interesting. The bulfinch especially I have paid great attention to. It is curious that of a nest of six young ones I brought up last year, four of them are hens; curious, because the cocks generally preponderate in about the same proportion. I have for two years had one of them paired with a canary,

but although they appeared completely attached, the bulfinch feeding the canary on the nest, &c., the eggs never hatched. I also tried the same experiment with the siskin, and with the same ill success, notwithstanding the opinion which exists that they will pair readily. A few days since I had brought to me a very remarkable linnet: this bird was of a dirty cream colour throughout the body, and the wings only differed in having those red streaks with which the common linnet is marked. The bird-catcher had been some time attempting to secure it; and when he did succeed, it came but singly from a flock of a hundred, down to his nets. It is curious that very near the spot where this bird was caught, a young lark was taken with white wings, and which having now arrived at maturity, presents a very curious appearance. Is this merely an accidental coincidence, or the effect of some peculiarity in this particular spot? I should think the former. I must now bring my rambling remarks to a conclusion, apologising for their prolixity. The man of the world may smile at what he deems the frivolity of such pursuits, and deem that attention thrown away which is directed to the observation of such diminutive objects; but for my part I am well content to say with friend Horace—

> "Libet jacere modo sub antiqua ilice,
> Modo in tenaci gramine:
> Labuntur altis interum ripis aquæ;
> Queruntur in sylvis aves;
> Fontesque lymphis obstrepunt manantibus
> Somnos quod invitet leves."

As links in the mighty chain, no "*created* things" are to be despised; they form parts of the stupendous whole, which is the work of Omniscience—the production of that Being, (to use the words of the poet,)

> "Who sees with equal eye, as God of all,
> A hero perish, or a sparrow fall;
> Atoms or systems into ruin hurl'd,
> And now a bubble burst, and now a world."

SOME NEW DESCRIPTIONS AND FIGURES OF THE NESTS AND EGGS OF SPIDERS.

BY SOLITARIUS.

I AM sorry that the circumstance of not being able to procure any work treating upon our British spiders, prevents me from furnishing

the reader with the names of the species to which the accompanying figures relate.

Fig. 1. Represents a spider's nest, formed by an old oak leaf being doubled and supported upon a rush, which penetrates the top of it. The sides of the leaf are apart from one another, but are prevented from spreading, by means of a thick web of silk extending from the margin of the one to that of the other. The two extremities of the upper part of the leaf are always open, so as to allow of the little inhabitant escaping upon the approach of danger. The first specimen I ever noticed I met with in a field near Wormwood Scrubbs, but I now find them in nearly every field in which oak trees grow; and in none of them do I notice any difference, except in the size of the leaf and the height at which it is supported from the ground.

Fig. 1.

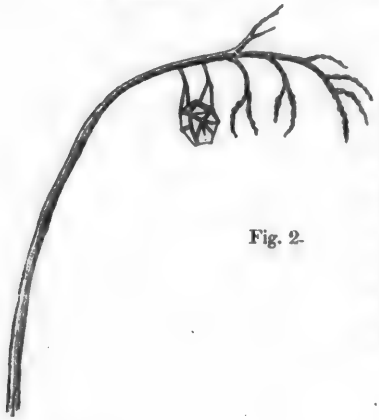

Fig. 2.

Fig. 2. Is that of an irregularly shaped deposition of eggs, found about a week since, attached to a piece of grass, on Hampstead Heath. The eggs are enveloped in snowy white silk, which also folds round the ends of two sprigs of grass, which, bending, act as its suspenders.

Fig. 3.

Fig. 3. Relates to another cluster of spiders' eggs, similar in its situation to the preceding, but different in shape and colour, being globular and brown. For what purpose this suspension is intended is not very apparent, unless it be for the purpose of placing the eggs beyond the reach of predacious larvæ, and such apterous (for it would not avail with the diptera, &c.) insects as might devour them.

MICE IMITATING THE GRASSHOPPER'S CHIRP.

In a field opposite Porto Bello Farm, near Wormwood Scrubbs, one evening in last May, my attention was attracted by a noise at the bottom of a hedge, resembling the chirping of a grasshopper, but accompanied by a rustling among the dry reeds and fallen sticks that lay beneath, caused by some little animal running and jumping under and over them alternately. This circumstance I have often observed in the country; and from the hasty glimpse which I have now and then obtained of the animal, I came to the conclusion that it was some shy little bird, and which for the want of a name I christened the hedge-creeper, but since I read "White's Selbourne," I renounced that name, feeling satisfied that it must be the grass-hopper warbler. But in the present instance, I embraced the opportunity of assuring myself as to its species; with which view I cautiously advanced towards the hedge, and patiently awaited, hoping to obtain another sight of it; but my approach had frightened it, and all was still for some time. I was bending over the bank, when suddenly I heard the same noise as before, and saw the little author of it run out from under the dead stalks, and giving a fluttering sort of jump, which defied one to form any idea of its shape; it concealed itself again in the dried rubbish under which it ran, uttering its grasshopper-like chirp all the while. I now had my "eyes about me," and remaining as perfectly still and motionless as

though I had been but an overhanging tree, I watched and listened attentively. Not many seconds had elapsed before there came another, a second, a third; but, to sum up, I do not think I shall exceed the limits of truth, if I say that there at length came the thirtieth of these creatures, and all from the same direction, and uttering the same cry as they jumped in their fluttering style one after another over my foot (which rested upon the bank), and then betook themselves to the same path as the leader did. Some of them, however, halted in their career at the sight of my foot, and then it was that I got a correct view of them, and was somewhat surprised to find that the objects of my attention were nothing more or less than mice of a thick bulky form, with blackish backs and light-coloured bellies, and abruptly terminated tails; but one individual, which I had nearly succeeded in catching, was of a beautiful sleek fawn colour above, and white beneath, and was in every respect an elegant little creature. In a short time they returned from the opposite direction; and coming out with more caution from their *run*, as it is termed, they first took a reconnoitring peep, but observing me perfectly motionless they at length collected round my foot to satisfy their curiosity, and were so desirous of removing it (for as it rested upon their *run* it intercepted their regular course) that two or three of them had actually commenced nibbling the leather of my boot. As fate would have it, however, I sneezed, and thus frightened this interesting group, which in a moment was dispersed in different directions; yet I still kept my quiet position, not doubting but that in a few minutes, when their fears had subsided, they would again return. It was not long before they did as I expected, but they came in a less regular order, some arriving from one quarter and some from another; and again they reconnoitred, but as I moved not, they appeared unapprehensive of danger. They had re-assembled round my boot, when I, who now felt anxious to capture a specimen, dashed my hand among them, endeavouring, but without success, to grasp one. It was with no better effect that I hit about with a stick in every direction in which I heard them running, for the purpose of disabling or killing one as a specimen, that its name might be ascertained. I waited some time afterwards, until it grew dusk; yet as I neither heard nor saw anything of them subsequently to my attack upon them, I retired from the spot, but well pleased with this singular occurrence.

SOLITARIUS.

July, 1833.

THE BRITISH MUSEUM.

BY E. G. BALLARD, ESQ.

The Camelopard, (*Giraffe*, Linn.)

This curious animal, of which the present are two of the largest specimens ever exhibited, when standing erect, and holding up its head, measures seventeen feet from the crown of the head to the ground, and eighteen feet from the point of the nose to the end of the tail. It is only nine feet high at the rump; the neck is seven feet long, and the distance from the withers to the rump is six feet.

Such is the general description of this interesting animal, but the Menageries, vol. 1. p. 339, will furnish us with several particulars of its structure and habits, which, though but borrowed from various sources, afford those data on which is founded the true character of the animal, and thus become valuable in a zoological point of view.

Of its structure and habits we have the following description: Le Vaillant, who saw the animal in its natural state, says, "The Giraffe ruminates, as every animal does that possesses at the same time horns and cloven feet; it grazes also in the same way, but not often, because the country which it inhabits has little pasturage. Its ordinary food is the leaf of a sort of mimosa, called by the natives *kanaap*, and by the colonists *kameeldoorn* (*Acacia xariffiana?*). This tree being only found in the country of the Namaquas, may probably afford a reason why the Giraffe is there fixed, and why he is not seen in those regions of Southern Africa where the tree does not grow.

"Doubtless the most beautiful part of his body is the head. The mouth is small, the eyes are brilliant and full. Between the eyes, and above the nose, is a swelling, very prominent and well defined. This prominence is not a fleshy excrescence, but an enlargement of the bony substance, and it seems to be similar to the two little lumps or protuberances with which the top of the head is armed, and which being about the size of a hen's egg, spring on each side at the commencement of the mane. His tongue is rough, and terminates in a point; the two jaws have on each side molar teeth; but the lower jaw has, beyond these, eight incisive teeth, while the upper jaw has none.

"The hoofs, which are cleft, and have no nails, resemble those of the ox. We may remark, at first sight, that those of the fore feet are larger than those of the hind. The leg is very slender, but the knees have a prominence, because the animal kneels when it lies down.

There is also a larger callosity on the breast, which would lead one to conclude that he generally rests on that part.

"If I had not myself killed the Giraffe, I should have believed, as have many naturalists, that the fore legs are much longer than the hind. This is an error; for the legs have, in general, the proportion of those of other quadrupeds. I say in general, because in this genus there are varieties, as there are in animals of the same species. Thus, for example, mares are lower before than stallions of an equal height. What has led to this error, as to the difference between the legs of the Giraffe, is the height of the withers, which, according to the animal's age, may exceed the height of the rump by sixteen or twenty inches, and which disproportion, when we see it at a distance, must have led to the belief that its legs were longer than behind. His defence, as that of the horse and other hoofed animals, consists in kicks; and his hinder limbs are so light, and his blows so rapid, that the eye cannot follow them. He never employs his horns to resist any attack."

To this quotation, which is sufficient for my present purpose, I may add one circumstance, mentioned under the head of Antelopes, in the same Menageries, p. 355; namely, "The Giraffe forms the second tribe, which is distinguished by having horns, or prominences on the frontal bone, covered with a soft skin, which is a continuation of the skin of the head. The horns exist in both sexes, and are permanent."

From these brief particulars, a few remarks arise relative to the peculiar structure of the head of this animal. We find that it is furnished with very full and prominent eyes. These, from the peculiar narrowness of the *os frontis*, do not admit of the deep-seated eye socket observed in the ox or horse.

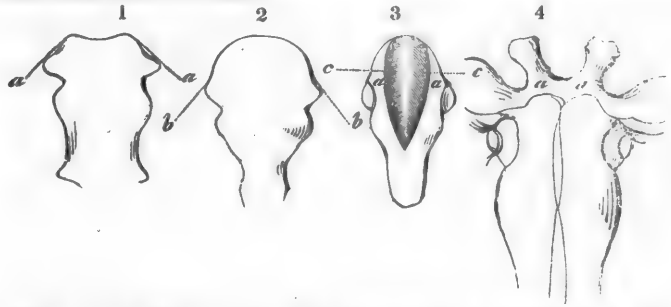

Fig. 1, 2, in which a blow from above would be thrown off in the direction *a a* or *b b*, and thus escape the eye; but in this animal the

protection of that organ appears to be provided for in the prominence *a* fig. 3, in which case a blow would be thrown off in the direction *c c* which I consider as the use of the conspicuous prominence on the frontal bone.

The prominences at the back of the neck, *a a*, fig. 4, I consider as placed there to give a firm and broad basis for the insertion of the strong and powerful ligaments necessary to support the long neck of the animal, which find a similar provision at their base in the height and expansion of the *scapulæ*, which form the withers of the animal. The above prominences may also serve as bases to the insertion of the muscles which support the head, as well as by their position form a protection to the tender horns with which the animal is furnished.

The Hippopotamus.

This huge and unwieldy animal, of which the present is a very fine specimen, has been estimated at various dimensions by authors. Some have been killed measuring seventeen feet in length, seven in height, and fifteen in circumference; according to the testimony of experienced travellers. But the individual before us does not by any means come up to the above standard of colossal proportions. Its colour is said to vary considerably, according to its situation; when just emerged from the water it appears of a palish brown or mouse colour, with a blueish or slate-coloured cast on the upper parts; and the belly is flesh-coloured, the skin appearing through the hair; but when quite dry, the colour is, as in the present instance, of an obscure brown, approaching to black, without any of the blueish cast. Its head is of great size and weight, and armed with formidable tusks. From its stupendous size, imposing appearance, and horrid aspect, it is calculated to inspire feelings of dread; but notwithstanding its exterior, it is of mild and inoffensive habits, and subsists wholly on vegetable food. Its singular faculty of sinking at pleasure when in the water, and continuing its course at the bottom, appears to indicate its possessing the open *foramen ovale*, common to some amphibious animals; while its thick skin resembles that of the whale, and is probably furnished with a mucilaginous secretion to prevent the effects of maceration.

I have been often powerfully struck, when viewing the uncouth form of this animal, in juxtaposition as it is with the light and elegant giraffe, at the wonderful adaptation of means to ends in their organisation. In the former all is suited to its habitation in the deep. Its ponderous legs short, and widely separated, and thus fitted either for

swimming or traversing the bed of the river, while its great length of body and consequent specific gravity enables it to sink with facility. What a contrast does this present to the long and agile limbs, lengthened neck, and light body of the swift and timid tenant of the mountain and the plain! Were they to change situations, how could the necessary adaptations be made in physical structure, according to the fanciful theory of some modern naturalists?

E. G. BALLARD.

Islington, 11*th Dec.*, 1833.

UPON THE NATURE OF THE PAR, AS OBSERVED IN SCOTLAND.

THIS small fish abundantly frequents our Scottish rivers, and (as is well known) is never found except in streams accessible to the sea-trout and salmon. We are aware that Pennant and other writers have disputed this fact, and attempt to prove upon their own observation, certainly not the most accurate, that few are to be caught in some waters which salmon are unable to ascend. Pennant mentions a stream in Inverness-shire in support of his assertion, the upper part of which is separated from the rest by an insurmountable water-fall, and yet contains par in considerable numbers. We have inquired into the truth of this statement, and find that it must have originated in some mistake of the learned tourist, who confuses with this fish a very small species of trout, inhabiting rapid and stony streams, and which, in external appearance somewhat resembles the par, without possessing any of its fixed and characteristic developments. Like that, it is white and silvery, active for its size, and in many cases marked on the side with those blueish impressions as of depending finger-points, which are erroneously supposed to be the leading distinction of the other; we say erroneously, because anglers must have observed, how even common and good sized trout are often set off with this peculiarity in different degrees. Nor do we wonder much at Mr. Pennant's statement, since we have known observing and scientific craftsmen fall into a similar error, and hold out to be the par what a little examination has proved to be the common river-trout. What then, it may be asked, are the points which distinguish this fish? And first, let it be noted how the par, with very few if any exceptions, hath only one row of scarlet spots or stars extended on either side, from the gills to the tail, whereas

the common trout hath always two or more of such rows, more varied in colour, and less equalised in their dimensions. Again, the pectoral fin of the par is broader, and contains a greater quantity of spines than that of the common trout. Thirdly, the gills are more silvery and clear of marks, being at no time impressed with more than one or two; while in the trout they have a yellowish appearance, and are studded over with a large number of dark spots. The tail of the one also is forked, that of the other mostly straight. In fact, there is in the whole aspect of the par, when narrowly examined, a singular difference from that of the trout. It is, besides, a nimbler and less cunning fish, and never seems to increase beyond a certain size, although well known to attain that maximum in the course of two or three months from its first appearance during the angling season. And this is a fact to which we beg attention, as it will shortly go some way to support our theory concerning the par, that it is the young of the salmon in a certain state.

In order to prove this, it will be granted to us, as we shall boldly assume, that Pennant's assertion is erroneous, and that this fish is only found in waters visited by the salmon; that, in point of fact, it has some sort of connection, whether direct or indirect, with the sea.

This postulate has been allowed by almost every writer on the subject, and yet has done little towards settling the question at issue. Three theories, barring the one of its being a distinct species of trout, are abroad concerning the par. The first and most general opinion is, that the par belongs both to the trout and salmon species, and is a sort of mule betwixt them. The second theory maintained by some reckons it to be the male of the sea-trout, whitling, or finnock; and the third, which is by far the soundest, is held, certainly we confess upon suspicious premises, by the Ettrick Shepherd, and assumes that the par is nothing else than the fry of the salmon.

We shall consider these three opinions individually, and give our reasons for supporting the last. First then, as to the par being a mule betwixt the salmon (under which term we include the grilse and whitling,) and river trout.

How happens it, that two such comparatively large fishes produce so attenuated a breed, when we know that the cross betwixt beasts, such as that of the horse and ass, is proportioned to the size of the animals, and that the four-footed mule is so much less than the one, and larger than the other? Neither does the crossing of different birds, such as the goldfinch with the bulfinch, diminish their offspring in any degree;—yet the par produced by one fish a yard in length, with another most

probably exceeding a foot, never attains half the weight of its smaller parent, and measures at most six or seven inches. Again it is singular, that in rivers where par lie, they muster as ten to one, compared with the common trout, a most extraordinary proportion of mules! which, if we consider the well-known precautions of salmon, while spawning, could not possibly be produced. These fish in ascending our streams pair off as spawner and milter; the female to deposit her roe, and the male not merely to impregnate, but guard the spawn against the attacks of trout and smaller fish, who naturally, instead of doing the same office, molest and devour it; and in the case of trout roe, the reverse happens; it is a favourite food of the salmon, and not likely to be impregnated by him, who is well known to watch so devoutly the operations of his own spawner. Hence, a very meagre portion indeed of the ova can possibly (and that by chance, when the water is heavy) be so crossed as to produce mules, if such a production were the consequence. How then is the fact of the par being found in such large numbers reconcilable, supposing them to be mules, with the other fact of the comparatively accidental crossing, which takes place between the salmon and trout? We submit the question to the maintainers of this theory for a solution. Again, what is the ground upon which the opinion is founded, that par are a sort of mules? Simply this, that they are incapable of breeding—that they have no spawners among them, and are seemingly all milters. We allow the statement to be true, although, as we shall presently show, it is somewhat questionable whether or not they be all spawners; at any rate they are all of one sex. But is this the case with mules? On the contrary, as is well known, the male and the female mule are just as fully developed in every part, as the stallion and mare are among horses. You have both the one sex and the other perfectly distinct, and their only inherent defect is a mutual incapability to extend the species. The formation of the par is, however, precisely the same in every individual. You have not that essential difference in mouth, by which the sex of fresh-water fishes is so easily ascertained. The internal structure of each is the same, examine whatever number you may; so that, if mules, they want the property common to them with other animals; a separation into sexes. And here we shall be asked, to which sex do we suppose the par to belong? The natural reply is, that they are milters; and thus we hold, in spite of the argument of a Clyde fisher from Hamilton we met with during a ramble, some summers ago, who cut up in our presence several of these fish, and pointed out in each of

them a small yellowish matter, collected near the back-bone, which he maintained was an incipient roe, although no more resembling it than the moon does a man's face. He likewise assured us of a fact, which during the experience of thirty years he had carefully noted, but whether worthy of credit or not we ourselves are unable to discern, namely, that the par in Clyde every fifth year are both fewer and much larger than they are in the other four. If this is the case, it proves nothing, but still it is singular; and no doubt every angler must have observed in most rivers, that one season often presents him with different sized fish from those of another, and that they are few or numerous, according to their size.

But leaving the mulists as sufficiently handled, we proceed to the opinion held by some, and by the author of an article in the Edinburgh Encyclopædia, that par are the males of the sea-trout, whitling, or finnock. This theory is at once overturned by the well-known fact, that these fish have the tail straight, or nearly so, while the par and salmon have theirs fully and beautifully forked. But supposing, as we grant it possible, that the growth of the fish changed in some measure the appearance of that appendage, still we are by no means at a loss for another argument, to be taken from open and conclusive facts, which readily exposes the error of this opinion. In the Rochil, a respectable stream, which joins the Earn, opposite to Comrie, in Perthshire, there are few par, except in the lowermost parts, where they are pretty abundant during the summer months. Two or three miles up, above a point where salmon generally halt, owing both to the uncertainty of the floods, and likewise to the interruption of a small but ill-assorted waterfall, in overcoming which a large fish runs the risk of falling either among bare rocks or shallows, par are seldom or never caught; and yet the sea-trout and whitlings run up without danger, and spawn in immense numbers many miles on, through the whole extent of Glenartney; nay, it is well known throughout Perthshire, that the Rochil is the best stream in the whole county for these fish, and that a dozen or more, averaging three pounds weight each, may be taken by a single rod among the highest pools in a proper season. If, then, par are the males of the sea-trout and whitling, or mules between them and the common trout, of which there are vast quantities in this stream, why are they not to be found among the innumerable spawn-beds along its course? A few surely might remain above as well as under the point alluded to; and yet we ourselves have never been able to capture one individual, although we have angled

there over and over again. But a fact somewhat similar may be noted, nearer Edinburgh, on the stream which runs into the Forth below Cramond, and also on the Esk close to Musselburgh, both of which are visited by a small species of sea-trout. From the former stream we have taken them in considerable numbers; and although angling with a small fly, we never caught or saw a single par. Also at Musselburgh the same thing has happened to us*.

We have thus disproved two theories respecting the par: first, that it is a mule betwixt the salmon and river-trout; and second, that it is the male of the sea-trout, whitling, or finnock. We are now narrowed to the following points—either that it forms a distinct and separate species of fish, or is the real fry of the salmon in a certain condition. In disproving one of these points we prove the other. Now as to its being a separate species of fish, we need only refer to the facts alluded to above, in order to refute this notion; viz., its known relation to the sea, its identity of sex, and want of generating power. But besides these we may further remark, that the par is known to grow rapidly, and that the same individuals do not remain in our rivers above a single season; because, as will be observed, the supply of every succeeding year is a supply of young and fresh-formed fish, without any intermixture of a former breed. What then has become of the vast quantities left in our rivers during the bygone season? Were they dead, a mortality so striking might easily be discovered by their remains; the fact is, they all proceed naturally to the sea, there to undergo those processes which submit them back to us in the shape of grilse and salmon. Nay, there is no other refuge for our opponents in this discussion to take to unless they revert, as we once heard an angler do, to the cross system, and maintain the par to be a breed betwixt the minnow and trout, both of which fish exist in waters inaccessible to the salmon; moreover, the folly of the cross system is here exposed, because we imagine it more likely for the minnow and trout to produce a mule, than a half sea-fish with one absolutely fresh-water. We have

* Salmon, however, are said sometimes to ascend these waters; we have heard of one being caught with the rod above Kirkliston. This, however, on further inquiry, turned out to be a species of bull-trout, bred in the long still pools below that village, and which are not unfrequently taken with the leister near the head of Almond during the spawning season. Salmon have certainly been caught close to the sea in the neighbouring bays, but we doubt very much their breeding in either stream. The fry of these fish have not been discovered of late years in any shape, whether as common smouts or par.

proved then, upon undeniable premises, that the par can be nothing else than the fry of the salmon; and we will now discover a few points of similarity in these fish, and relate a singular circumstance, which about a year ago turned our attention to this subject. And first, as to the similarity between them. Both have the tail forked—the gills marked in the same manner—the ventral fins strong and blackish; while in trout they have a less fixed and generally yellowish colour—the dorsal one more extended than in the latter fish—they have both an activity proportioned to their sizes, and an equal affection for rapid streams.

The external shape, although not fully developed in the par, is yet similar: it wants the proportions of a grown fish, no more than the foal those of the horse. Its head, indeed, is somewhat rounder—requiring elongation—the back too straight, and displaying a want of strength: but still the principal points are alike, discovering an intimate and mutual kinship. And here an objection will be taken to the colour of the par, and its want of those silvery scales which belong to the salmon; but let it be remembered that as yet it is in a manner an unclean fish, not having proceeded to the sea; how then can it be expected to retain this brilliant covering, when salmon themselves in ascending rivers throw it off, and become, in some cases, undistinguishable from a large, common, ill-fed trout? We believe, however, that the young fry, when first produced, exhibit a coat of scales which lies on them till spring, when many descend in shoals to the salt water, and the others remaining cast it off; nor does it grow again until the end of autumn, when they are prepared to journey sea-ward with the floods which happen about that season. Nor is such an hypothesis altogether imaginary; for we come to the relation of a circumstance, the happening of which grounded our belief on this theory, and no assailable one it is, if our eyes, which are good, did not deceive us. Last spring, after the time when smelts generally descend, we chanced to capture a few of them in St. Mary's Loch, the streams about which are a favourite breeding-place for salmon. These were of a large kind, and had been prevented from joining the spring shoals by their inability to discover the outlet to the lake; they were soft and loose in the scale, but, seemingly, an enticing bait for pike, which frequent a smaller sheet of water immediately above St. Mary's.

In the afternoon, happening to use one of these smelts on our pike-tackle, we remarked how its scales came off in great numbers, discovering beneath a perfect par, not to be mistaken in any one respect. This accidental discovery we further confirmed by repeated experiments; and

we are now convinced, beyond a doubt, of the fact, that par are the young of salmon in a certain state.

Nor have we availed ourselves in the minutest degree of the observations of the Ettrick Shepherd, in the Agricultural Journal; for we esteem his method of proof as somewhat fallacious, and at war with the established doctrine of chances; yet we have conversed with those who asserted the accuracy of Mr. Hogg's statement; and we know it to be the constant practice of the Bard of Altrive to mark the tail-fin of his par with a peculiar incision, not difficult to recognise. We confess, however, that it is wonderful: first, that Mr. Hogg should be able to catch the ten-thousandth portion of the par frequenting Yarrow;—secondly, that out of a few hundreds which he might catch and mutilate, such a number should reach the sea—undergo the many chances of disaster on the way thither—the more hideous perils of that element—that they should ascend the stream of their birth in preference to many others; and, that when of good size, and liable to be taken on ever so many occasions by human means, they should, escaping net and hook, otter and leister, arrive uninjured before Mr. Hogg's nose, and allow him to transfix them through and through in order to discover their personal identity. All these circumstances combined, it seems as if fortune were peculiarly gracious to the poet in overcoming what is next to a physical impossibility—in invalidating the origin of evidential law, and throwing the calculating system of philosophers back among the rubbish of ignorance and error.

We have avoided upholding Mr. Hogg's method of supporting this theory, for no other reason than that we find ourselves unable to answer the many objections which it calls forth; but we think, notwithstanding, that the theory is a good one, that it is worthy of general credit, and that such a manner of support might prove no small advantage to our salmon fisheries in Scotland. We call not for the interference of an act of legislature in order to prevent the destruction of par; such a measure would fall too severely upon the brethren of the streams; it would rob the honestest of our countrymen of a kindly and quiet privilege; it would root out a better sort of men, and a nobler pastime, than are to be found amid the hum of cities and the haunts of viciousness; and that in order to gratify the palates of epicures, and adorn the tables of luxury. But we would submit it to every able angler as a principle he ought to adopt, to commit again to the waters those tiny fish which come ignorantly to his hook; and at best are but a meagre morsel, and give small proof of his skill in the gentle craft.

There are unprincipled poachers enough, who make it a glory to harass our waters with net and lath; who annually diminish, by some millions, the healthiest fry of our salmon; who depopulate many a river by means of their nocturnal enginery. But we wish not to see, classed with these, the humane and virtuous, the true and patriotic angler; who should be above employing his energies on such indiscriminate slaughter; caring not to check the growth of some future salmon, by the unprofitable and childish act of destroying the infant fish.

RAMBLING NOTES.

BY J. H. ANDERSON, ESQ.

As you deemed my last rambling notes worthy of insertion in your January Number, I am induced to offer a few more, for any future number, when you have not more interesting matter to give us from other correspondents. A few days after the date of my last epistle, I was so fortunate as to fall in with and capture a bilcock or water rail (*Rallus aquaticus*). I never had the pleasure of handling and examining one before, nor was I aware that we had got this interesting species so near us. You may be sure I was very much delighted with my prize; aye, not even a sailor could be more so, when his gallant foe has struck in bloody fight, nor the soldier when the leaguered town is won. Montagu gives an excellent description of this bird at page 33. The only variation was in weight; his weighing four and a half, and mine exactly five and a quarter ounces.

Mine is a male bird, and was very fat when taken.

In Vol. I. at page 272, of the *Field Naturalist*, Ruricola says he found the nest of a yellowhammer (*Emberiza citrinella*) built in a hedge about eighteen inches from the ground. I can add my testimony to his and Colonel Montagu's, that they do sometimes, though rarely, build in such situations. I think I shall be under the mark when I say, I have seen not less than half a dozen in my time, and more than that in furze bushes. I recollect an instance of finding one in a hedge about three feet from the ground perfectly well, from the attending circumstances thereof. The old bird was on the nest at the time we found it; and so, taking it as a mark, my comrade let fly an arrow from his bow, which pierced through nest and bird together. The horrid crime thus perpetrated has riveted the place and circum-

stance in my memory. The poor bird's dying shrieks even now ring in my ears, while I touch on the subject. My observations accord with Colonel Montagu's, with respect to the time of building its nest; it is late, when compared with the several other kinds of birds. The one seen by Ruricola might be an exception to the general rule. An early or late spring may influence them in some measure, and does, there is no doubt of it. Some few individuals, perhaps, may cling to the old doctrine; yet I attribute such matters to the influence of the moon, but adopt the former theory. Last summer I found out this bird to be an excellent friend to the gardener, by destroying caterpillars.

On looking into Montagu's Dictionary for the Yellow Wagtail, it says, "a name for the winter wagtail." This must surely be an error of the press.—*Quere.* Should it not be "a name for the spring wagtail?"

The spring wagtail (*Budytes flava*) goes under the name of the yellow wagtail with us hereabout; and out of the three, is the only one entitled to the name in my opinion.

I have seen the nest of the pied wagtail (*Motacilla lotor*) in two instances, in what perhaps may be considered by many rather out of the way places. They were both on the high wold hills in this neighbourhood, and neither of them within a mile or two of any stream; but there were artificial ponds for cattle to drink at, within four or five hundred yards of both. One was built on the top of a shepherd's sod hut, in a large sheep walk, where whins abounded. The hut was covered over with whins and loose straw as a protection from rain. I was on a piratical cruise after birds' nests and young rabbits, &c., when I found this nest.

The other was built in a more curious situation still; and as I had heard and read of an artificial method of hatching eggs, I was almost inclined to think the wagtails were trying the experiment. It was built five or six feet from the ground in the side of a pyramidal sod heap, which had been thus piled up for the purpose of being burnt to ashes as manure for turnips. Owing to unfavourable weather, part of the outside wall of sods had not been consumed by the fire; and in this part the birds had built their nest, which had eggs in it when I found it.

It happened unfortunately for them that the ashes were wanted before they had time to complete their experiment; and as I have not since seen the experiment repeated by any kind of birds, I am not able to inform you and your readers what the result would have been.

No boy was ever more fond of birds and birds' nesting than I was; had I been a close observer of nature, I might have had a budget full of

interesting facts respecting birds and animals; but I am sorry to say I was not.

I have frequently rambled for miles over the hills and dales, and through woods and brakes, in search of birds' nests and young hares and rabbits. I have often with another companion or two visited that beautifully romantic place, Falconer's Hall, seven or eight miles distant from our homes, on expeditions of this kind. I probably may give you an account of some of our visits to that place by and by. It stands on the high wold hills, and commands a fine view of the country around; a finer place for hawks and hounds cannot be conceived.

Falconer's Hall was built for the celebrated Colonel Thornton of sporting notoriety. In his day it was the resort of beauty and of wit; the scene of revelry and mirth. The ploughman was then often cheered by the sound of "the echoing horn," and the hills enlivened by the gallant train of horsemen in the field. But hear the immortal Peter's song:—

"Come, sportsmen, away,—the morning how fair!
To the wolds, to the wolds, let us quickly repair;
Bold Thunder and Lightning * are mad for the game,
And Death and the Devil are both in a flame.

"See, Backers, a kite!—a mere speck in the sky—
Zounds! out with the owl—lo, he catches his eye—
Down he comes with a sweep—be unhooded each hawk;
Very soon will they both to the gentleman talk.

"They're at him—he's off—now they're o'er him again:
Ah! that was a stroke—see! he drops to the plain—
They rake him, they tear him—he flutters, he cries,
He struggles, he turns up his talons, and dies.

"See a magpie! Let fly—how he flutters and shambles!
How he chatters, poor rogue! now he darts to the brambles;
Out again—overtaken—his spirits now flag—
Flip! he gives up the ghost—good night, Mister Mag.

"Lo, a heron! Let loose—how he pokes his long neck,
And darts, with what vengeance, but vainly, his beak!
Egad he shifts well—now he feels a death-wound,
And with Thunder and Lightning rolls tumbling to ground.

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* Thunder, Lightning, Death, and Devil,—names of four hawks.

An uncle of mine, who was a true sportsman in his day, says he once met above three hundred gentlemen and farmers at breakfast at Falconer's Hall, after which they had a stag chase.

"Thus we falconers sport—then homeward we stray,
To fight o'er the bottle the wars of the day;
And in honour at night of the chase and its charms,
Sink sweetly to rest, with a dove in our arms."

Kelham, Yorkshire, 27th of January, 1834.

ON THE PRODUCTION OF INFUSORIA.

BY E. G. BALLARD, ESQ.

THE inquiry which your correspondent, "Tyro," has made, relative to the "changes which take place among the particles of vegetable matter when submitted to the putrefactive process, so as to produce these singular creatures," involves many particulars relative both to chemistry and vegetable physiology in its first point, namely, the "putrefactive process;" and, secondly, another intricate investigation, on the actual generative production of these animalcules from the oviform state. Such I consider to be the real state of the question propounded by your correspondent.

In subjects of this nature, the extreme minuteness of the objects of research, which are only visible under the most powerful microscope, renders it impossible to determine their habits or changes, even in the *adult* state, much less to detect the imperceptible *ova* from which they are probably hatched; for *equivocal generation*, I presume, is excluded from your correspondent's inquiry. Under these circumstances, probable *conjecture*, on sound and rational principles, is all we can have to aid our investigations.

Having thus placed the question in its true light, I shall proceed to examine,—

1. The putrefactive process in vegetable matter.

Without entering minutely into the chemical analysis of vegetable matter, which, throughout the whole vegetable kingdom, according to Nicholson's Chemical Dictionary, amounts to no less than twenty-nine various ingredients, we may briefly observe that the following are *universal* constituents of all vegetable substances; namely, 1, Sugar; 2, Gum; 3, Starch; 4, Gluten; 5, Albumen; 6, Gelatine; 7, Wood; 8, Fibrin. Of these he gives the following definitions:—

1. Sugar—crystallises; soluble in water and alcohol; taste sweet; soluble in nitric acid, and yields oxalic acid.

2. Gum—does not crystallise; taste insipid; soluble in water, and

forms mucilage; insoluble in alcohol; precipitated by silicated potash; soluble in nitric acid, and forms mucous and oxalic acids.

3. Starch—a white powder, insoluble in cold water; taste insipid; soluble in hot water; opake and glutinous; precipitated by an infusion of nutgalls; precipitate redissolved by a heat of 120°; insoluble in alcohol; soluble in dilute nitric acid, and precipitated by alcohol; with nitric acid yields oxalic acid and a waxy matter.

4. Gluten—forms a ductile, elastic mass, with water; partially soluble in water; precipitated by infusion of nutgalls, and oxegericycæ muriatic acid; insoluble in alcohol; by fermentation becomes viscid and adhesive, and then assumes the properties of cheese; soluble in nitric acid, and yields oxalic acid.

5. Albumen—soluble in cold water; coagulated by heat, and becomes insoluble; insoluble in alcohol; precipitated by infusion of nutgalls; soluble in nitric acid; soon putrifies.

6. Gelatine—insipid; soluble in water; does not coagulate when heated; precipitated by infusion of galls.

7. Wood—composed of fibres; tasteless; insoluble in water and alcohol; soluble in weak alkaline laxivium; precipitated by acids; leaves much charcoal when distilled in a red heat; soluble in nitric acid, and yields oxalic acid.

8. Fibrin—tasteless; insoluble in water and alcohol; soluble in diluted alkalies, and in nitric acid; soon putrifies.

1. By this analytical survey, in which I have been minute on account of the future inductions, we may observe that all but the starch, fibrin, and wood, are soluble in water, and the gluten partially so.

2. We also find that the gluten, which remains undissolved, forms a ductile elastic mass with the water; and, besides, becomes viscid and adhesive by fermentation, and then assumes the properties of cheese.

3. We discover that the albumen and the fibrin soon putrify.

4. Thus we have, as the component parts of vegetable matter, *four* soluble substances, *three* insoluble, *one* partially soluble; and of these, two soon putrify. Besides these, we have, according to a more accurate chemical analysis, the elastic products or gases, carbon, hydrogen, and oxygen; nitrogen is a constituent principle of several, and the fixed and volatile alkalies are also found.

Having now decided the component parts of the matter or subject in question, we come to the process by which it is decomposed, and the agent employed. The process is *maceration*, and the agent *water*.

Maceration is that process by which a body is steeped in a cold liquor.

It does not differ from digestion, excepting that the term is never used when the temperature of the mass is raised beyond that of the surrounding air.

On the nature and phenomenon of the putrefactive process in vegetable matter, we have the following excellent account in Rees's Cyclopædia:—

"The conditions necessary for the putrefaction of vegetables are similar to those required in the putrefaction of animal substances. It is necessary that the organisation be impregnated with water; the contact of air is necessary, as also a certain degree of heat; and for the due effect of this kind of decomposition, the vegetables should be heaped together, and their juices be abundant. In these circumstances, the phenomena of decomposition are as follow:—the colour of the vegetable is changed, the green leaves become yellow, the texture becomes lax, the parts less coherent, the colour of the vegetable itself changes to black or brown, the mass rises and perceptibly swells up, the heat becomes more intense, and is perceived on approaching the heap; and the fumes that arise have already a smell, which sometimes is not disagreeable; at the same time bubbles arise and break at the surface of the liquid, when the vegetables are reduced to a *magma*, or mass of feculent matter. This gas is a mixture of nitrogen, hydrogen, and carbonic acid. At this epocha, likewise, an ammoniacal gas is emitted, which is formed in these circumstances; and in proportion as these appearances diminish, the strong and offensive odour is succeeded by another which is fainter and milder, and the mass becomes dry. The internal part still exhibits the vegetable structure when the stem is solid, and the fibrous matter has been the predominating principle; and it then constitutes manure or soil. Hence it arises that the herbaceous plants of a loose texture, and abounding in juices, are not capable of forming manure by their decomposition, but are reduced to a brown mass of little consistence, in which neither fibre nor texture is observed; and this is what for the most part forms vegetable mould."

This is, decidedly, one of the clearest descriptions that can possibly be given of the theory and phenomena of vegetable putrefaction. The *circumstances*, however, are not the same as those recorded by "Tyro;" and, consequently, the *effects*, or *results*, or *products* will be different.

Let us then examine each.

First, in the *usual circumstances* there are the following conditions: 1, impregnation (not *maceration*) with water; 2, the contact of air; 3, the accumulation of the vegetable matter in a heap.

The results are:—1, a change of colour; 2, a change of consistence; 3, a rising or swelling up of the mass; 4, a great degree of heat; 5, the disengagement of fœtid fumes; 6, the evolvement of a combination of gases; 7, the change of the vegetable substance into a magma or feculent mass; 8, the drying of the remains into the form of manure, or vegetable mould.

Second, the *required circumstances* are:—1, maceration in *stagnant* and *unchanged* water; 2, the imperfect access of air by the interposition of the surrounding water; 3, the loose contact of the stalks or leaves of the vegetables, owing to their partial diffusion in a fluid medium.

In all cases of philosophical, and more especially in chemical investigation, we are to consider *causes* and *effects*: the latter, by the immutable laws of nature, being the result of the former. If the *causes* (or *circumstances*) be precisely the same, the *effects* will exactly coincide; but if the *effects* are different, we must seek for the *reason* in some *alteration* or *modification* of the *cause*.

Now, in the present case, the *causes* or *circumstances* have been shown to be *altered*, or *modified*, and we must therefore expect to find a variation of *effects*, or a difference in the *results*.

Accordingly we find the following *effects* proceeding from their respective *causes*:

Cause 1.—Maceration in *stagnant* and *unchanged water*.

Effect.—The effect here is two-fold. 1st, The constant maceration of a vegetable when severed from its *root*, which is the natural medium by which moisture is received by the plant, cannot conduce to its nourishment, but will sensibly aid its decay, because no circulation can possibly take place; fresh water would, indeed, produce a temporary revival, but its death and decomposition would ultimately ensue. But here is, 2nd, A water *stagnant* and *unchanged*; and, consequently, not only maceration aids decay, but it is accelerated by the momentarily increasing quantity of decomposed vegetable matter which arises from the process of putrefactive fermentation which is going on. Hence arise the *results* of gluten, gelatine, and magma; all of which are to be found in the water, and are the *solid* parts of the vegetable matter decomposed.

Cause 2.—The imperfect access of air, by the interposition of the surrounding water.

Effect.—This produces *results* different from the *usual circumstances*. 1, The evaporation of moisture from the mass is prevented, and the water becomes charged in a considerable degree with those

gases which would otherwise evolve. Hence the offensive smell of the mixture. 2, The heat not being so powerful as when the vegetable matter is only *impregnated* with water, the gluten and gelatine still remain unchanged, and are held in *suspension* in the water. 3, The magma, which would be dried and become vegetable mould, remains as a feculent matter, also held in *suspension* in the water. 4, The ammonia, probably, which would have exhaled in the state of gas, is held in *solution* by the water, and gives it new properties.

CAUSE 3.—The loose context of the stalks or leaves of the vegetables, owing to their partial diffusion in a fluid medium.

EFFECT.—This will effectually prevent the extrication of the heat which is produced by the close context of the vegetable matter when in a heap, and the decomposition will consequently be slower and more imperfect.

Having gone through the principal elements of the subject,—viz. 1, The component parts of vegetables: 2, the nature of putrefactive fermentation: 3, the *usual circumstances* and the *required circumstances* under which this process proceeds: 4, the *causes* and *effects* of the *required circumstances*:—we now come to demonstrate the actual state of the water, which we must now consider as an *infusion*, and how that state produces the animalcules, which are the subject of "Tyro's" inquiry.

We have then an *infusion* consisting of water, holding in *suspension* a compound of gluten, gelatine, albumen and magma, as also numerous insoluble ingredients. It holds in *solution* a portion of the nitrogen, hydrogen, and carbonic acid, and probably ammonia.

In this, when in a state of putrefactive fermentation, a number of minute animalcules (called *infusoria*) are detected by the aid of the microscope. To suppose that these animalcules are *produced* by the putrid infusion, without the agency of eggs from parent animalcules, would be to admit *equivocal generation*, a theory too absurd and monstrous for any philosopher, much less a christian, to admit for a moment; but the puzzling question then presents itself—whence did the eggs come?

To answer this question in a fully satisfactory manner to the minds of *all* enquirers, may be a matter of considerable difficulty; but I think our previous analytical investigation will lead to the following inductive reasoning:—

As these animalcules are found in *liquids only*, and the species referred to in putrefactive infusion generally, and as all stagnant waters

which hold putrid vegetable matter in suspension afford some of them, I think we may conclude that *water* is their native *element*, and putrid vegetable matter first their *nidus*, where they are *hatched*; and, perhaps, their first *pabulum* or food on their exclusion from the egg. I do not say their *constant* food, since the oxy-hydrogen microscope clearly shows that they are cannibals, and devour each other.

If, then, we consider the eggs to have been laid in the water. (though too small even for the most powerful glasses to detect) and only to require a proper nidus, pabulum, and temperature, to bring them to life, we have in the infusion in question all the conditions required—viz., gluten, gelatine, and magma, as nidus and pabulum, and the heat generated by the process of putrefactive fermentation; added to which we have the temperature of the atmosphere in the summer season, when they are most abundant.

With these few remarks I shall close this tedious dissertation, which, I trust, will throw some light on the object of "Tyro's" inquiries, and induce some of your more learned correspondents to pursue this highly interesting subject.

Islington.

CHAPTER OF VARIETIES.

ACCOUNT OF A CANARY.—In the Christmas of 1831 I procured a fine canary bird (*Fring. canaria*, Linn.) For a considerable time I expected him to break out in the bold strains of his species, but still he was mute. At first I attributed it to his removal; to his being in a strange place. The spring advanced and summer came, and all the foreign warblers graced our plains and cheered our groves; the only note he would occasionally give was a simple *tweet tweet*, for silence was with him the order of the day. When autumn approached I procured a very active and lively goldfinch (*Fringilla cardualis*, Linn.), with excellent action and song, with the hope of eliciting something from this taciturn being; this had no effect. Moulting time came; that was an excuse for him, and continued long. I did not know what to think of him; sometimes I thought it must be a hen; at other times I thought it must be diseased or weak—then a weak bird he was considered. In the following March I procured *another* of *good character*, which was soon proved; for the second day he broke out in full song, as if he had been long accustomed to the house; unintimidated he

"tuned his pipe and sung his lay," and poured forth his full notes in sweet profusion; but he had no influence on the other. Wanting his cage, I turned him in a large one in a room upstairs, where I gave him the companionship of a young unmoulted goldfinch, which moulted and sung. But the other was obdurate; it seemed as if cheerfulness or music never touched his breast, and he appeared as if he was determined it never should issue from it. At length his cheerful little companion died; and as the winter was now approaching—it being Christmas time—I thought the room would be too cold for him. I purchased a small cage for him, and brought him to my parlour in companionship with his former friends. For two days he sat on his perch, "burly and big," with his usual silence. On the following day, on my return home, I was informed that he had sung; I thought there must have been some mistake. But on the next morning I had a convincing proof by a lengthened strain; since that time he seems to be priding himself in emulating the others, always responding, and very frequently preceding and calling to time.

It really is astonishing to see the emulation and activity displayed by this uncertain and hitherto idle bird. He appears as if he was desirous of repaying for his long-suspended song by its now peculiar fulness and continuity; and as if proud of his acquirements, even before daylight, when the fire is lighted, he will begin with a short prelude of invitation to the other. There is a peculiarity in the character of this bird, who should thus break out with such emulation, energy, quickness of action, and melody of song, after a quiescence of two years.

Old Dawley Park, Jan. 27. PHILOAVES.

WANT OF A SYSTEM OF ORNITHOLOGY.—In reading your Field Naturalist's Magazine—which, I may stop to say, pleases me—I find a disregard of the system of Linnæus in your ornithological remarks, without the adaptation of any other system in its place; each writer on that history seems to give his own terms, or adopts those of another, but I cannot discover that any *general system* is pursued If the system of Linnæus is exploded—which I make no doubt subsequent discoveries in the science have tended to nullify—will you be pleased to inform me if any other system on ornithology *is established*, and what are its principal features, divisions, and characters * ?

I would suggest—would not the system of ornithology make a

* There are several systems, such as Temminck's, Vieillot's, the Quinary, as I have sketched in "Architecture of Birds."—EDIT.

feature in the above Magazine, making it a leading article therein; beginning, as you would in the Linnæan system, at the order *Accipitres*, giving the genus Vultur, *with all the known* species of that genus, in succession. From thence to the genus Falco, with *its different species until complete;* thus completing an order, &c., until you get to Picæte; and so on, until the whole of the orders, &c., are disposed of. Cuvier's "Animal Kingdom," published by Henderson, is not sufficiently clear; it is too brief and ill-arranged: witness the additional notes and the shortness of the text.

Old Park, Dawley, Jan. 27, 1834. PHILOAVES.

METHOD OF FORMING A ROOKERY.—If N. N. wishes to establish a rookery, and has suitable trees for them, he has only to get a nest or two of young ones from some neighbouring haunt, and place it in them. The old ones will find and come to feed them, and these will the following year return there to breed. A colony may thus be obtained whenever he wishes one, provided there is any other establishment within three or four miles of him. His host of ironical questions I will not pretend to answer, especially as many of them have already been so ably replied to. C. PARSONS*.

MIGRATION OF THE TREE SPARROW (*Passer arboreus*).—This bird is a constant winter visitant here. I have shot them repeatedly in severe weather in January, intermixed with the common sparrows in the farm-yards, and also with green-finches, chaffinches, and other small birds in the fields; about a fortnight ago I caught one at night in a folding net in a corn-stack, when in quest of common sparrows. I never saw one here in the summer months.

I have been induced to offer these remarks in consequence of an observation in your Magazine, vol. i. page 468, that the tree sparrow might prove a bird of passage, and the fact of some alighting on a vessel off the Suffolk coast; but many of them certainly prefer the winter air of Southchurch to a sea voyage.

Many of the small birds perform partial flittings from one part to another, that do not come under the denomination of migratory birds; and it is only by observations and correspondence from all parts of the country that these minor changes of situation can be ascertained.

Southchurch, Feb. 8, 1834. CHRIS. PARSONS.

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* Other communications from our intelligent correspondent will be acceptable. —EDITOR.

On the dunlin (*Tringa variabilis*).—The birds "Pliny of Lancaster" has seen on the sea shore, presenting an alternate dark or silvery white appearance as they have their backs or breasts towards him, is the dunlin (*Tringa variabilis*) in winter plumage; the purr or stint (*Tringa cinclus*) of Bewick, or ox bird, as it is here called, of which his dunlin (*Tringa alpina*) is a figure and description in its summer plumage.

With regard to their scarcity. In summer they disperse to breed, to what part I am not able to say (none of them stay in this neighbourhood), and at that time it is most probable that not more than a pair will be seen together; but about the middle of July the old ones arrive here, and the first of the young the beginning of August; and all that month and September continue to come, and during the winter, may be seen in immense flocks traversing the surface of the water; or sometimes rising higher, they appear like a dark cloud, and rapidly turning and presenting their breasts to the spectator, they all at once appear of a snowy white. These evolutions are chiefly performed during the time of high water; and when the tide leaves, they may be seen busily running over the sands in quest of food.

In February, a few red feathers may be seen on the backs of some individuals; in March they become beautifully variegated, and the black on the breast begins to appear; many of them take their departure this month; some, however, stay till April, and a few even to the beginning of May: these acquire their full summer plumage before they leave; and it is then that I have obtained them in greatest perfection for preserving, although some good coloured ones may be got when they first return in July.

The young when they first come, are very differently marked from the adult bird in any state of plumage, and it is exceedingly interesting to watch the progress of their changes of colour during the months of August, September, October, and November, when they get their perfect winter dress, and are no longer to be distinguished from their parents.

C. Parsons.

The redbreast.—I am sorry to have committed any error in the few observations (*professedly* "facts") which appeared in your number for February; but speaking of the robin, I should have said that he enters the *suburbs of London*, about the middle of August; for it is rarely that he is seen in the metropolis during the breeding season, though in winter his familiarity is daily observed. It was the circum-

stance of my writing in London which led to this mistake, which I hope you will excuse, being from a tyro. I am aware that in country villages the robins are plentiful throughout the year, though when the young have flown, like all other birds, they are most abundant; and yet the next breeding season they do not appear more so than the last, and we never notice, in any district, one species to become gradually more numerous. As, for instance, the swallow: the departing flocks are beyond comparison larger than those which return in spring, and one would suppose that there would be a perceptible increase, but this is checked by numerous accidents, to which migratory birds are subject, such as diminution by storms in crossing the ocean, and by the attacks of birds of prey and other enemies in travelling overland: so admirably is every thing in nature arranged, and so true is the balance of Nature's scales.

With regard to "animals swallowing hard substances," I had often heard of the ostrich swallowing stones, &c.; but was surprised to observe the cassowary at the Surrey Zoological Gardens swallowing several stones of considerable magnitude, *after having already passed through the bird*, apparently without being injured; how often this process was repeated, I had not patience nor inclination to discover; nor do I know whether it be a new fact respecting this bird or not. T. C.

SPONTANEOUS GENERATION.—"Tyro" notices animalcules found in water, and says "there can be no doubt, I think, that they owe their being to decomposition." I wish I could give him "a few hints upon this subject;" but unfortunately can only suggest one or two queries, being more fond of contemplating Nature's more beautiful, though perhaps less astonishing, works.

1. Do not these animalcules, or at any rate the spawn, eggs, (or from whatever else they may be produced), exist at all times in water? and is it not their extreme diminutiveness which prevents their being seen, even with a microscope?

2. Is it not their increasing in size which renders the water putrid?

3. Is not decomposition the effect of these very animalcules?

I should be glad to be enlightened respecting these points, or informed of the best work upon the subject *. T. C.

RATS AND GUINEA PIGS.—Some people, I believe, have an idea that *rats* are afraid of guinea pigs; when I kept rabbits I had great diffi-

* I have taken up this question at some length in "Insect Transformation." I have also given the more recent discoveries in the "ALPHABET OF NATURAL THEOLOGY," now in the press. ED.

culty in preserving them from rats; for though the doors of the hutches were lined with tin, the rats would squeeze through an almost incredibly small space, and I have frequently seen one feeding out of the same trough with an old rabbit, though the young they would destroy without ceremony. I had also a collection of the spotted cavy; and though placing but little faith in the notion that they would prevent the depredations of rats, I was willing to make the experiment, and allowing some to run about in the "rabbitry," I placed the rest in a hutch by themselves; but what was my horror upon opening the door, one morning, to find the whole collection of "pigs" weltering in their gore; a prey to their kinsmen, the rats*. I have had much painful experience that so far from rats being afraid of guinea pigs, they evince a particular partiality to them.

The spotted cavy is remarkably cleanly in its person, spending much time in smoothing its coat; it produces generally two, or three, sometimes four at a litter, which run about as soon as born, and grow remarkably fast. How this little animal came by the name of *guinea pig* I cannot conceive, as I believe it was originally brought from Brazil. There is no food of which rabbits and guinea pigs are so fond as the leaves, stalks, and juicy pod of the maize, or Indian corn, and they will touch no other food while a particle of this remains.

AURORA BOREALIS.—A splendid aurora was seen at this place on the 28th of December last, at about six o'clock in the afternoon, appearing, I am told, more to the eastward than is usual with this phenomenon; it was followed within twenty-eight hours by the tremendous south-westerly gales which prevailed on the last day of the year. As I did not myself witness it, I am sorry to be unable to furnish a particular description of its appearance.

E. BLYTH.

Tooting, Feb. 4th, 1834.

THE SNIPE (*Scolopax gallinago*, Linnæus).—A short time since a snipe was brought to me, slightly wounded in the pinion. It refused at first all nourishment, and would probably have been starved, had I not forced a few worms down its throat, and held its beak until it swallowed them; it soon began to swallow worms if merely placed

* It is possible that this accident might be caused by *stoats*, though I never saw any in the place; the bodies were not mangled, but a hole made in the head, through which their enemies had extracted the nourishment.

between its mandibles, and would retain one occasionally for a considerable time in its bill, seizing it in a very adroit manner, and contriving to hold it straight along its bill's whole length. In the course of a few days it fed itself, consuming a most amazing quantity of earth-worms, the major portion of which it ate by night; but this being rather troublesome food to procure, I endeavoured to get it to feed on bread and milk, by putting into it some cleanly washed worms; but was unsuccessful, though Montagu succeeded thus with the woodcock. It soon picked out the worms, and I have reason to believe, from the appearance of a pan of water to which it had access, washed every one of them before swallowing it, as a curlew did, mentioned by Montagu. I kept it for some days on short commons, putting only about a dozen worms into its mess, in hopes that it would soon be forced to take to the bread and milk, but all to no purpose; it became so much reduced in three days that I was compelled to desist, and to furnish it again with its natural aliment, worms, which, in a very short space of time, restored it to its previous good condition. I allowed it the range of a small garden, and when first suffered to remain loose, it would frequently, as may be supposed, endeavour to fly away; at such times it would run about spreading its tail in a very singular manner, the caudal feathers being expanded as widely as possible, and the whitish last feather on each side showing very conspicuously; but not spread horizontally, in the manner of the American redstart of Wilson (*Setophaga ruticilla*, Swain), or the Swedish blue breast (*Pandicilla suecica*, Mihi), but turned up perpendicularly, that is to say, on one side of the bird the upper surface only could be seen, on the other side only the under part, appearing, indeed, on a superficial view, like the tail of a common barn-door hen; it never thus placed its tail excepting when it intended to spring up into the air, but would then run swiftly along, first turning one side of it uppermost, then the other, thus shifting it every two or three yards, until it made a sudden spring, with the intention of flying away. It ran with great celerity; and, what is singular, would often when loose in the garden run into a cage for protection, in which it had at first been confined. I know of no writer who has mentioned the snipe's singular mode of spreading the tail; but Mr. Selby observes, in his most admirable description of the woodcock, that that species "just before rising, upon being disturbed, or when running, jerks its tail upwards, partly expanding it, and fully showing the white that distinguishes the under surface of the tips of the tail feathers." It is by means of this extreme mobility of the tail that these birds are

enabled to perform those sudden turns and evolutions in the air which render their flight so remarkable. I observed that in the living bird the eye did not appear to be placed so far back in the head as it does in dead specimens, and as it has generally been represented in drawings. The markings of the plumage also, in the living bird, are beautifully regular, forming a well-defined pale brown or cream-coloured line along the crown of the head, and three similar lines down the back, which are never the least discomposed. This disposition of the snipe's plumage should be carefully attended to in stuffed specimens.

E. BLYTH.

Feb. 5th, 1834.

ON THE NOTIONS OF P. W.—In your Chapter of Varieties for last month, a letter (signed P. W.) is introduced, which, as it contains notions that I can hardly conceive any one can seriously entertain, I would rather suppose is meant as a joke on the numerous theories that start up daily, or to see if persons can be found credulous enough to believe any absurdity, so that it possesses originality and a seeming plausibility. As coming from a correspondent in the Magazine, some few may, without examination, and without perceiving the writer's intention, think the ideas good, and attach more weight to them than they deserve; for their sakes I will treat the letter as one which gives P. W.'s opinion truly, and I hope in a few lines to show the utter fallacy of such notions. Granting that the sea is two or three miles deep, that an observer might have every favourable opportunity, that the sea should be clearer than crystal, and telescopes more perfect even than any yet invented, still do I assert that P. W.'s ideas cannot be supported, for these few, but, as they appear to me, important reasons: that the Megalosaurus, Icthyosaurus, &c., were *formed for breathing air*, and that though they might continue under water for some time, yet sooner or later they must come up to respire; that the Pterodactyli, or Ornithocephali, *flew in the air* like bats; and that the Mammoth was in every respect *a land animal*. The latter part of P. W.'s letter, is, I think, rather obscure. Does the writer suppose that there is a stratum of air under the mass of water three miles deep? If so, I would ask him how it is retained there? how prevented from ascending through the heavier liquid above? or, granting that it could be retained, how would it be renewed? for so many large animals would surely soon destroy its purity. If, as P. W. imagines, these living beings are to be found at the bottom of the sea, and my idea of his stratum of air be correct, they

must either swim about in the water, *descending to the air* to breathe, and never touch the earth, or they must move on the ground in this dense stratum of air, and, excepting the Pterodactyli, which have wings, not be able to get to the water; both of which notions appear to me incomprehensible, and, according to their conformations, are next to impossible.

By inserting this you will much oblige a constant reader of your excellent Magazine.

I beg leave also to state to P. W. that the Cornu Ammonis is not a snail, but a Cephalopod.

WILLIAM FOWLER.

February 12th, 1834.

WINTERING OF THE HOUSE FLY.—In the last number of your Field Naturalist, I observe that your correspondent M. of Southampton mentions it as a remarkable circumstance that he had a common house fly in his room so late as the 16th of January. I was myself surprised at their long stay with us; but such has been the extraordinary mildness of the season, that I have seen them every day, up to the present moment, with the exception of a few days that I was from home, during which interval, I am told, they did not forsake theirs. Sometimes one fly only has appeared for days in succession, at other times several would appear together. Many times, both in January and February, I have taken one, sometimes two, out of the milk. They seem to have little strength, for they will admit of very near approach before they take flight; and upon one occasion, seeing one fly from a dish of broccoli on to the table, I very gently placed a small piece of that vegetable near him, upon which he immediately began to feed, without any apparent alarm. At this moment, February 18th, there are two in the room. The wintering of these insects appears much more mysterious than that of the swallows, about which so much has been written. I should be happy to see a satisfactory account of their migrations*.

E. K.

St. Paul's Church Yard, 18th February.

THE CAT AND THE RABBIT, &c.—Your having favoured a former communication of mine, on the habits of tame birds, with a place in the "Field Naturalist," induces me to hope for the like indulgence now. I have always been fond of studying the habits both of birds

* The Natural History of the House Fly is still obscure.—EDITOR.

and animals; and, if I have benefited by it in no other way, I have at last found much innocent amusement in it; and this, with submission to your correspondent N. N., is an object not altogether unworthy of attention, even if Cock Robins and Tomtits should happen to contribute to it. But on this head I know that your opinion coincides with my own, as you prove by the manner in which the "Field Naturalist" is conducted. Some years ago, I kept a tame rabbit, a very fine and large specimen of the common domestic variety, and who for boldness, sagacity, and playfulness, equalled any monkey: he had the range of a small garden and the lower part of the house; nor indeed was he confined to the lower part, for he could go up and down stairs as easily and as well as the biped inhabitants; he was very fond of playing before the kitchen fire with a large cat; sometimes, however, they did not agree, and the cat would erect her back and hiss at him, when he would leave the kitchen at full speed; presently his head would be seen peeping in at the door; and, if the cat's back happened to be turned towards him, he would hop softly up to her and disturb her meditations with a sound box on the ear from one of his fore-paws; he would repeat this several times successively; he was frequently caught, when he thought himself unobserved, dragging bunches of turnips, carrots, and greens, from the kitchen to a dark closet, in which he slept. In going into the garden, this little animal had three rooms to pass through: he would beat at the first door with his fore paw, until admitted; then cross the room, and repeat the same operation at the next door, looking wistfully back for assistance to any one in the room; and so on into the garden, from which he returned in the same way. He was quite devoid of fear, and would fight any one with his fore paws, sitting upright in the most ludicrous manner. He was at last stolen, to my great regret. At different times, I have kept several squirrels; one in particular was perfectly tame, and devotedly attached to the person who usually fed it. It was not confined to the cage, but was frequently indulged with liberty, when it would run up and down the body of its protector, enter his pockets in search of nuts, which it generally found, and, sitting on his shoulder to crack them, suffered itself to be carried all over the house. It was so tame that we often allowed it to run in the garden; in a moment it would be at the top of a mulberry tree, about twenty feet in height, and hop about from branch to branch; but at the call of its protector would immediately descend and get on his shoulder, or into his pocket to be carried to the cage: it was a common thing to see this squirrel at play

with the cat; it would get on her back, and sit there as long as it thought proper without any fear whatever: I observed that at times it was more than commonly playful, and would amuse itself for hours together with any thing that came in its way.

Squirrels are particularly dexterous in the arrangement of their bed or nest. I would strongly advise all who keep them in cages never to put hay into their little dormitory; a bit of wool or flannel would be much better, as it would not so conveniently harbour vermin, and would obviate the danger of the squirrel being strangled by the hay becoming twisted round his neck;—a fate which overtook one in my possession. MATTHÆUS SYLVATICUS.*

London, Feb. 12, 1834.

THE REV. A. WELLS ON INSTINCT †.—This is an excellent provincial production, upon a very difficult subject, well written, and shrewdly reasoned, and only deficient in being too brief; but this was, of course, unavoidable. The following specimen will show our readers the style in which Mr. Wells has cleared up some of the points, often rendered obscure and mystical even among good writers.

"Instinct, then, is *not* mere *mechanism,* or *organisation.* A bee does not form and store the cells of a honey-comb, a bird does not build a nest, as a power loom produces a fabric of calico, or a watch indicates the hour of the day, by a mere arrangement of mechanical powers, or suitable organs. The organs of the creatures are the instruments by which instinct works, not that guiding power itself. Nor is instinct mere *sensation.* The various irrational creatures do not accomplish their wonderful labours and actions because certain sensations prompt their activities, and find in them their gratification. That sensation, as well as organisation, is subordinate and auxiliary to instinct, is, indeed, highly probable. It may rouse to effort; it may determine as to the materials selected for use; it may, by finding its gratification in instinctive labours, secure perseverance and success in them. But sensation is not a guide; it is *an impulse:* it may move, but cannot direct; or, if at all, only in those subordinate instances, such as the

* Our correspondent will perceive that his verses on a Garden have been transferred to the Magazine of Botany and Gardening.—EDITOR.

† On Animal Instinct: a Lecture delivered before the Members of the Mechanics' Institute, Colchester, by the Rev. A. Wells; and published by their request. 8vo. Colchester, 1834.

choice of food, in which the evidence of sense at once determines between the injurious and the wholesome. Neither is instinct *sagacity*. Brutal sagacity is in many instances very great; but it is most easily distinguishable from instinct, and in many respects stands perfectly contrasted with it. Sagacity, by exercise and tuition, may be improved—instinct cannot. Sagacity displays itself where the guidance of instinct fails. Sagacity is most perfect and remarkable in creatures whose instincts are few and simple; as the dog, the horse, the elephant, and the monkey. Sagacity is various in different individuals of the same species; instinct is uniform in every separate tribe. Sagacity in a brute resembles reason in a man; it is a contriving faculty: it observes circumstances, and makes use of them; it perceives difficulties, and provides against them; it can receive instruction, remember facts, and profit by experience. But of instinct the exact reverse is true: it works where contrivance and instruction, experience and observation, are all alike impossible, and can be of no advantage. What, then, is *instinct?* A guiding faculty, given for a specific purpose; within which design it directs with unerring correctness, but beyond which it has no light or power; equally effectual for any operation, however simple, or however complex; surpassing reason as much in the steadiness of its operation and the certainty of its results, as it falls short in extent of application and capability of improvement. A light to these humble creatures emanating from the *Father of lights,* as much suited to their necessities and happiness, as reason and revelation are to ours. But of the particular nature of this guiding faculty, and of the mode in which it operates, we can, perhaps, know no more than the individual who possesses only the sense of hearing can comprehend of sight, which he never enjoyed: he can be informed of its results and discoveries, as we can observe the wonders of instinct; but in either case, we must possess the faculty to enable us to do more than perceive its effects, and give it a name."

On the Colours of Natural Bodies, by Sir David Brewster, V. P. R. S. Ed.*—The only theory of the colours of natural bodies that has met with reception in modern times, is that of Sir Isaac Newton, who considers them as identical with those of thin plates, and as varying with the size of the ultimate particles of the body.

Although this theory, ingenious as it is, be liable to many great

* Read before the Royal Society of Edinburgh.

objections, and be not capable of explaining the phenomena, even if its postulates be admitted; yet the author of the present paper does not assail it with any arguments of this kind. He has, on the contrary, attacked it in its stronghold, and has endeavoured to bring it to the test of direct experiment.

Sir Isaac Newton considers the green colour of plants (the most general colour which nature presents to us) as a *green* of the *third* order of periodical colours, and has also given us the exact composition of this particular colour.

In order to determine the composition of the green colour of plants, the author dissolved their colouring matter in alcohol; and having analysed it by a fine prism, he found it to have, in every case, the same composition. The portions of the spectrum, however, which entered into its compound tint were totally different from its theoretical composition, as assigned by Sir Isaac Newton; and had no relation whatever to the colour of their plates. The green colouring matter exercised an arbitrary specific action upon different parts of the spectrum, and its green colour was owing to its having absorbed a certain number of rays, which, when subtracted from the white light, left the colour under consideration.

In order to render this result more general, the author examined an immense number of coloured solutions, obtained from plants and artificial salts, and a great variety of coloured solids, either formed by art, or obtained in nature; and in all these cases he found no indication whatever of periodical colours. The colours were invariably produced by the absorption of certain definite rays taken arbitrarily and unequally from different parts of the spectrum; and, excepting in the case of certain imperfectly transparent and opalescent fluids, there never was the slightest trace of a reflected tint similar to that which might have been expected, had the Newtonian theory been true.

On the Gradual Elevation of Land in High Northern Latitudes, by J. F. W. Johnston, Esq., F. R. S. Ed.*—In this paper, the author showed by a number of phenomena observable within the coasts of Sweden, chiefly around Stockholm, and on the shores of the lake Macler and its arms, that the conclusion of the Swedish surveyors in 1821, that a change of the relative level of the land and water

* Read before the Royal Society of Edinburgh.

along the coasts of the Baltic had in many localities taken place, could not reasonably be disputed. He then considered if it were possible that the level of the Baltic could have fallen, being, by its connection with the North Sea, a branch of the great ocean; and concluded, from the permanency of the respective level of the land and water on the coasts of Pomerania, among the Danish islands, and at some points on the shores of Finland, that the level of the Baltic Sea had undergone no change of level for the last six hundred years. The change observable on the coasts of Sweden, therefore, must be due to an elevation of the land, now gradually, though insensibly, in progress. This rising is estimated to proceed at present at the rate of about one foot in twenty-five years.

The absence of any record of violent volcanic action in the Scandinavian Peninsula renders it improbable that the rise is due to such a cause. The author referred it, therefore, to the gradual cooling of the crust of the earth, which, by causing a contraction and compression in parts where the cooling was a maximum, tended to elevate other portions of the earth's surface at points or in lines of minimum resistance.

The centre of the action in Scandinavia he considered to be in the mountain chains which traverse Norway, and Sweden, and Finland respectively; and which are mutually connected beyond the head of the Bothnian Gulf; and attributing the original elevation of these chains, with Elie de Beaumont, to the secular refrigeration of the earth, he found in the rise still observable in Scandinavia a relic only of that once powerful action by which these mountain ranges were originally projected. He suggested the probability also, that on other coasts where high mountain ridges ran parallel with the sea, accurate measurements of the mean level of the water, in reference to the scarped rocks on the coast, if repeated at certain distant intervals, might make known other gradual elevations still in progress, similar to those observable on the shores of the Baltic.

The Editor's HAND BOOK OF ALLOTMENT AGRICULTURE is now in the Press, and will contain a new rationale of the effects of fallowing, hitherto so much misunderstood among agricultural writers.